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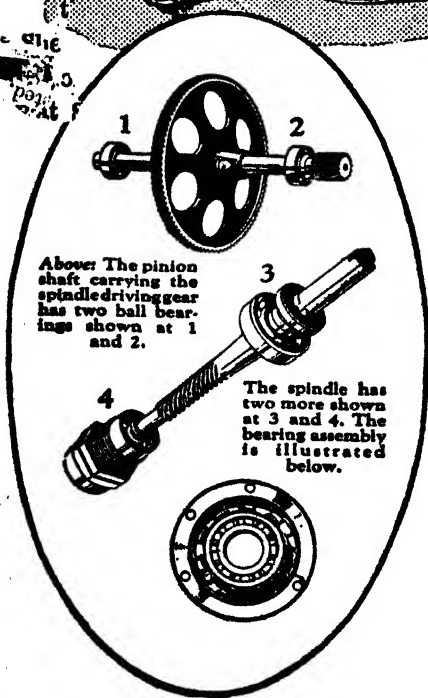
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Conferences.

Conferences of the Agricultural Bureau will be held as under:—

Southern, August 20th, at Murray Bridge (Secretary, Mr. S. S. Jones).

Hills, August 28th, at Balhannah (Secretary, Mr. H. A. Spoehr).

Murray Mallee, September 30th, at Alawoona (Secretary, Mr. B. L. Finney).

Eyre Peninsula (Eastern), October 6th, at Kimba (Secretary, Mr. W. Hutchens).

Eyre Peninsula, October 8th, at Wudinna (Secretary, Mr. C. A. Newbon).

Non-irrigated Fruits Districts, November 4th, at Angaston (Secretary, Mr. K. Robinson).

Papers, questions, &c., for Conferences should be in the hands of the General Secretary, Agricultural Bureau, Adelaide, a fortnight before the respective dates stated above.

List of Probable Dates of Country Shows During 1930.

Name.	Secretary.	Address.	Approx. Date of Show.
Eudunda	C. R. Treloar . .	Eudunda	September 24th
Streaky Bay	R. A. Kay	Streaky Bay	October 1st
Blyth	E. E. Eckermann .	Blyth	October 1st
Kapunda	W. J. Tylor	Kapunda	October 4th
Belalie (Jamestown) .	L. M. W. Judell .	Jamestown	October 7th and 8th
Great Flinders (Lipson)	C. J. Partington .	Lipson	October 8th
Loxton	J. M. Smart	Loxton	October 8th
Lameroo	H. H. Perrin . . .	Lameroo	October 8th
Tarlee	H. E. Reed	Tarlee	October 8th
Wooroorra (Tarlee) . .	A. R. Reed	Riverton	October 10th
Pinnaroo	J. H. Dewhirst . .	Pinnaroo	October 15th
Clare	F. W. Knappstein .	Clare	October 18th
Central Yorke Penin. (Minlaton)	D. M. S. Davies . .	Minlaton	October 22nd
Mount Gambier	H. L. Kennedy . .	Mount Gambier . .	October 22nd and 23rd
Tatiara (Bordertown)	A. F. Baker	Bordertown	October 29th and 30th

Secretaries of Show Societies are invited to advise the Editor of the dates of their Shows.

Effectiveness of Granulated Superphosphate.

"Is granulated superphosphate as effective as a fertiliser as the finely ground product?" Professor A. J. Perkins (Director of Agriculture), replying to this question at the Conference of Upper North Branches of the Agricultural Bureau, held at Tarcowie on July 17th, said that the answer to this question was decidedly no, on the understanding that in each case not only the water solubility of the phosphoric acid present was the same, but also that the physical properties of hardness and compactness was identical in either sample. He had added this proviso because lumpy or granulated super might consist of exceedingly hard unit particles or be made up of an aggregation of smaller particles which crumbled away very readily. The superiority of fineness of division might be illustrated as follows:—Any substance that was water soluble entered into solution in soil moisture at a rate which was governed by the surface area of each particle; the greater the surface area exposed, the greater the quantity of water soluble material which entered into solution in soil moisture. Again, for the same weight of material, the smaller the particles, the greater the surface exposed, not only to soil moisture present, but also to contact with the root system of young plants growing in its immediate neighborhood. This question of fineness of division was of greater importance in the case of supers than in that of readily soluble substances, such as nitrate of soda or sulphate of ammonia. The latter entered into solution almost

ROYAL SPRING SHOW 1930.

~~~~~  
**SEPTEMBER 13 to 20**  
**(INCLUSIVE).**  
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GENERAL ENTRIES CLOSE AS UNDER :—

Dairy Produce	Wed., July 23rd
Cattle	Thurs., Aug. 7th
Sheep	" " "
Pigs	" " "
Pat Stock	" " "
Horses (Heavy, Roadster, and Blood)	" " "
Swine	" " "
S.A. Industries and Manufactures (including Dried Fruits, Apiculture, Cookery, Needlework, Art Crafts, Woodwork, Drawing, &c.)	" " "
Schools' Competition	" " "
Judging Competitions	" " "
Log Chopping	" " "
Horse Shoeing	" " "
Poultry, Pigeons, Dogs, and Cats	Tues., Aug. 12th
Horses-in-Action and Trotting	Thurs., Aug. 21st.

~~~~~  
Particulars, Prize Schedule, and Entry Forms on application  
to the undersigned.

**HAROLD J. FINNIS,**  
Secretary.

**23, WAYMOUTH STREET,  
ADELAIDE.**



**Publications Received.**

“Geological Structure and Other Factors in Relation to Underground Water Supply in Portions of South Australia,” by R. Lockhart Jack, B.E., F.G.S., Deputy Government Geologist. Bulletin No. 14, Department of Mines, South Australia.

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—“British Industries and Empire Markets,” by Professor A. J. Sargent, M.A. (Empire Marketing Board Report, No. 26); price 1s.

Empire Marketing Board, Report dated May, 1929, to May, 1930; (Report No. 28); price, 1s.

“The Biological Control of Insect and Plant Pests.” W. R. Thompson, Ph.D., D.Sc. (Price 1s. net.) Empire Marketing Board Report No. 29.

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## ORCHARD NOTES FOR SOUTHERN DISTRICTS. AUGUST, 1930.

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[CHAS. H. BEAUMONT (District Horticultural Instructor).]

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With the exception of a few peach trees, pruning should have been completed, and all that remains to be done is to sharpen and put away the tools in readiness for next season. Care in the use of tools will prevent rust and the need of renewals.

This month is the latest in which the use of dormant treatment for fungous pests will meet with any success. Prevention means less cost, both in time and material. Winter treatment should not be given if there is any sign of buds swelling; this includes the washing of vines for anthracnose.

It is necessary to watch citrus trees for brown rot. Pick up all diseased fruit and burn it, and keep limbs up from the ground. Bordeaux mixture is helpful in preventing spread of brown rot, but it must not be used if trees are to be fumigated.

Peach and cherry aphid may be noticed at any time now, and the early broods should be destroyed at once. Tobacco is the remedy.

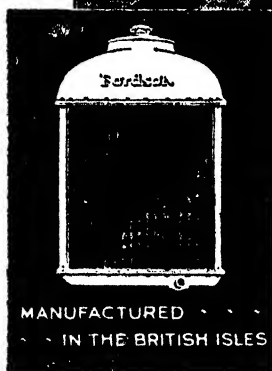
Cultivation is the best work the orchardist can do to assist his trees; the final ploughing should be done while the soil is in good order. Harrowing can well be left until the soil begins to dry on top; see that the soil is worked up close to the trees. If it is intended to use sulphate of ammonia, it can now be worked in lightly around the trees.

Strawberry beds need a lot of attention to get the best results; all weeds must be cleaned out and soil kept loose.

Tomato glasshouse work consists mainly in keeping the soil worked and free from weeds and diseased plants; it is also necessary to keep the ground outside in good order and free from weeds or other plants.

Spraying or dusting machinery should be tested to see that it is ready for use, so that no hitch occurs when it is needed; a delay of a few days may mean the loss of the crop.





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## INQUIRY DEPARTMENT.

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Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

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[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Secretary Agricultural Bureau, Wasleys, reports unbroken colts that have difficulty in passing water.

Reply—I am of the opinion that the trouble is a digestive one. The following treatment is suggested:—(1) Drench affected colt (9-18 months) as soon as signs of illness are observed with following mixture:—Raw linseed oil, 6ozs.; turpentine, one tablespoonful. Mix thoroughly before giving. (2) Subsequently give a small level teaspoonful of powdered nux vomica three times during the day (morning, mid-day, and evening). Mix with treacle and smear on tongue. (3) Feed on a little long hay containing not too much grain for three-four days. If several foals are affected, the ~~foal~~ is at fault, and a change of feed will have to be made. Bran mashies are useful for regulating bowels.

"E. T. K.," Kilkerran, has cow stiff in hind quarters, in poor condition.

Reply—(1) Give the following drench:—Epsom salts, 1lb.; ginger, 4 tablespoonfuls; treacle, 1 cupful; warm water, 2 pints. (2) Subsequently give a level teaspoonful of powdered nux vomica night and morning for 10 days. (3) Supply bran in the ration and green stuff daily if possible. Further, mix four tablespoonfuls of sterilized sweet ground bonemeal in the damped feed daily for three-four weeks. All the cattle should be supplied with a mineral mixture. The following is recommended:—Finely ground Nauru rock phosphate, 2 parts; salt, 1 part.

"O. E. K.," New Residence, has mare continually rubbing herself on posts, &c.

Reply—The following treatment is suggested:—Starve horse for 18 hours, and at the end of that period give this drench:—Raw linseed oil, 1 pint; turpentine, 4 tablespoonfuls. Subsequently feed on good nourishing food, including a little crushed oats. Further, clip horse all over and take care of him after doing so by rugging at night, and if necessary stabling.

"E. Bros.," Karoonda, has horse, seven years, bad cough and foul smelling breath, appetite very poor.

Reply—Make a careful examination of the teeth for dental irregularities and any decaying teeth. If present, have them attended to. Further, the following treatment is suggested:—Starve for 18 hours, and at the end of that time give the following drench:—Raw linseed oil, 1 pint; turpentine, 4 tablespoonfuls. Subsequently feed good quality chaff (which should be damped) and bran. If possible, add a ~~little~~ crushed oats. If cough persists, give a tablespoonful of Fowler's solution of arsenic night and morning, mixed in a small damped feed, for 14 days.

"P. W. D.," Lucindale, asks (1) if it is advantageous to wash out an aged mare prior to service; and (2) treatment for cows eating fowl manure.

Replies—(1) The only object in so doing is to bring away any discharge or correct acidity, and nothing is to be gained in using any solution unless it is for such a specific purpose. The washing can be done two or three hours before service of the horse, using such solutions as baking soda, one tablespoonful to the pint of water; common salt, one heaped teaspoonful to the pint of water. "Baking" the mare (passing in the hand and arm into the womb) is often practised by men leading stallions, but is only effective where there is a catarrh of the organ, the object being the removal of the



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discharge and stimulation of the organ. The commonest cause for barrenness in an aged mare is that through disuse the genital organs have atrophied. (2) Cows eating fowl manure. This is indicative of a deficiency of phosphates in their diet, and it is suggested that the quantity of the lick you are giving be increased by giving the same amount twice a day, and in addition, place some in a box to which the cattle can have access at any time. "Top" sheep and cattle lick, No. 1, would be quite as efficacious and cheaper to use.

"T. B. Z.," Mudamuckla, asks treatment for horse with strangles.

Reply—(1) Isolate the animal. The disease is highly contagious. (2) Keep warm and put on to bran mashes and green feed. (3) Supply drinking water in bucket and put 2ozs. of Epsom salts in it. Change daily. (4) Do not drench. (5) Treat swollen throat as follows:—Apply a mustard plaster. Mix mustard with water to about same consistency as that used for the table, and rub this on both sides of the throat up to the roots of the ears and down between the jaws. (6) As abscess comes to a head apply hot fomentations or repeat mustard until it bursts. When this occurs syringe out with lysol solution (tablespoonful to a gallon). (7) If breathing is bad, steaming the head could be tried. (8) Do not return horse to work until fit and strong.

"H. J. C.," Chandada, asks if bluestone solution can be used for worms in horses.

Reply—Although rarely used for the purpose, copper sulphate can be used to kill worms in horses. If used, two drams of copper sulphate mixed with two drams of sulphate of iron are given in a ball, administered fasting, and repeated daily for a week. I take it that you are referring to the strength of copper sulphate solution, which is used for pickling purposes. This is a 1 per cent. solution. Two pounds of oats pickled in such a solution would contain approximately half dram or less of copper sulphate. Without experimenting it is difficult to say what action as a vermifuge this drug would have when given in this manner. It could be tried and the results would be of interest. The treatment as outlined by the inquirer should not be given for more than 10 days, as after this period copper sulphate may cause digestive disturbances.

"T. W.," Cleve, asks treatment for horse staked above the fetlock.

Reply—The history of the patient suggests that a portion of the stake is still in the part, or that an abscess is forming. *Treatment*.—Clip hair off leg adjacent to the original wound and apply hot foment (or a poultice) to the part. When the swelling comes to a head, it should be carefully opened with the point of a sharp penknife to establish good drainage. Then a warm solution of lysol (two tablespoonfuls to a pint of water) should be injected two or three times daily, and the wound searched for presence of piece of stake, &c. The swelling higher up the leg is due to abscess forming at site of original wound.

"E. H.," Moorlands, has horse with an injured fetlock discharging pus.

Reply—You do not state where the matter (pus) is coming from, i.e., whether from the heel or the fetlock. If from the heel, steps should be taken to make a careful inspection of the foot for the presence of a stake, nails, &c. If wound is on fetlock, apply hot foment two or three times a day, or a hot poultice (antiphlogistine is the best). Heel injuries often occur as the result of being trodden on by adjoining horses in a team when turning, and may become a serious condition owing to the lateral cartilage inside the hoof wall becoming injured. Treatment of this condition is by hot fomentations and bathing in hot disinfectant solutions.

"J. E. A.," Pinnaroo, reports cow giving a creamy curd from one quarter of the udder, with a hard lump in the teat.

Reply—The cow is affected with mammitis. When first noticed, it should have been given the same treatment as you are applying now. The quarter is now probably chronically affected, but the treatment that has been given should be still applied with the exception that camphorated oil should be used. Care should be taken that other quarters are milked out before attending to affected quarter. A cow should be dried off from six to eight weeks prior to calving.

"A. R. H.," Meribah, asks the advisability of using mustard as a cure for sand in horses when administered with flour and water and made into a pill.

Reply—The effect of mustard taken internally is that it helps digestion of food by increasing the blood supply to the stomach and causes the expulsion of gas from the bowels. For veterinary use it has sometimes been prescribed for old horses affected with chronic intestinal catarrh, combined with powdered nux vomica and Carlsbad salts, where there is diminished power in the bowels, but the principal use of mustard used internally is to stimulate gastric secretion. Mustard would not have any effect on lung functions.



"A. B. H.," Ceduna, reports horse that hangs its tongue out continually whilst at work and attempts to pass water.

Reply—The tongue lolling may be due to an abrasion in the mouth caused by dental irregularities. Or it may be due to the animal experiencing some difficulty in breathing when in draught. The repeated desire to urinate is probably just due to a reflex irritation of the bladder by pressure on it of overlying bowel distended with foodstuff, and it is probable that overloading of the bowels with food is responsible for a difficulty in breathing when at work. The following treatment is suggested:—Make an examination of the animal's mouth for dental irregularities; have same attended to. Give the animal a dose of physic to unload the bowels, and subsequently feed on more concentrated rations. See that the bowels are kept in good order and constipation prevented by giving a weekly bran mash or a daily allowance of green feed. If the animal tends to get his mouth well down on his chest when at work, it may be necessary to use an overhead check rein to keep his head in a more extended position.

"E. O. G.," Bordertown, reports horse continually rubbing its tail.

Reply—This may be due to two causes:—(1) Accumulation of dandruff and other debris at base of tail. (2) Presence of small worms (oxyurids) in the back passage. *Treatment.*—One of the places most generally overlooked in grooming is the base of the tail, and washing with warm water and soap is recommended. In the case of the cause being due to the presence of worms in the hind gut (rectum) which is generally denoted by switching of tail and a sticky, yellowish-colored deposit about the anus, the treatment is mainly given per rectum, and consists of the injection of either of the following solutions:—(1) Infusion of tobacco, 1oz. to the quart of water. (2) Three teaspoonfuls of lysol in 2 pints of water. These injections should be given through a piece of  $\frac{1}{2}$  in. hose with a funnel inserted in one end. Previous to the injection of either of the above solutions, the bowel should be emptied by an injection of glycerine in water, or warm soapy water. Repeat the treatment at intervals of six days, and keep the anus free of the yellowish deposit until indications prove that worms have disappeared. The administration of a purgative drench of raw linseed oil, 1 pint; oil of turpentine, 2ozs., is also of assistance in expelling worms which are present in gut, but out of reach of the rectal injections, and should be given after starving the horse for at least 12 hours.

"G. F.," Wilmington, asks for particulars of the disease "red-water" in cattle.

Reply—This condition is of varying types such as:—(1) Tick fever (not present in South Australia).—Common in Queensland. The diagnostic symptom is the passing of bloody-colored urine. (2) Parturient "Red-water."—Occurs from a few days to several weeks subsequent to act of calving and characterised by frothy urine which as disease progresses assumes a smoky tint, changing later to red and finally to deep porter color. (3) A specific type of "red-water" associated with growths in the bladder is found around Mount Gambier area. It has never been observed in any other part of South Australia. (4) "Red-water" in cattle may also be due to calculi injuries, &c. (5) Another type of "red-water" has occasionally been reported in this State and in Victoria. It is not associated with parturition. Affected cattle are poor in condition, and urine becomes dark brown in color. It is believed to be associated with the type of pasture on which cattle are feeding. Recovery usually takes place in about seven days. This last type of "red-water" is probably the form reported to me from your district. The following treatment is recommended for it:—(1) Give following drench early:—Sodium chloride, 12ozs.; thin linseed gruel, 4 pints; treacle, 2lbs. (2) Subsequently give the following powder twice daily for three to four days mixed in the feed:—Magnesium sulphate, 1oz.; sulphur sub.,  $\frac{1}{2}$ oz.; sodium bicarbonate,  $\frac{1}{2}$ oz.; ferri sulph. exsicc.,  $\frac{1}{2}$ oz.; pulv. carui sem.,  $\frac{1}{2}$ oz. (obtain from local chemist). (3) Change feed as far as possible; supply greenfeed (lucerne, &c.), and also bran and linseed meal.

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## SUBTERRANEAN CLOVER.

(*Trifolium subterraneum*.)

[By W. J. SPAFFORD, Deputy Director of Agriculture.]

Subterranean clover has been known for a very long time in Central and Southern Europe. In those countries it is looked upon as a roadside weed, but it has been proved in South Australia to be an extremely valuable fodder plant for certain districts possessed of special natural conditions. In some types of soil it will produce more high-class fodder than will any other of the well-known fodder plants. The credit for discovering, proving, and giving publicity to this really important fodder is practically wholly due to the late Mr. A. W. Howard, of Mount Barker, South Australia, whose efforts for a period of more than 30 years in this direction are now being appreciated in all of the States of the Commonwealth, and in many other countries in the world. Mr. Howard's endeavors to popularise this fodder plant were unceasing, and throughout he acted in a most public-spirited manner, writing articles on the clover, supplying seed gratis to many parts of the world, and giving full advice on methods of handling, etc., to all who desired his help; and before his death, on March 2nd, 1930, he fortunately



**SUBTERRANEAN CLOVER**—Showing the mass of growth produced by this pasture plant when properly grown.

had the gratification of seeing the fruits of his labors, for thousands of acres in this State alone were carrying Subterranean clover, all the States of the Commonwealth were growing some of it, and requests for seed and information were being received in great numbers from almost all countries in the world having a temperate climate.

Because of its special characteristics, this clover has revolutionised the farming practices of some districts in South Australia, and has converted many farms, where difficulty has been experienced to make profits by other methods, into valuable livestock farms, with much increased land values, and capable of earning direct profits. Moreover, a really considerable area of land densely covered with scrub, which previously could not be economically cleared and cropped, has been liberated for agricultural purposes because of the ease with which Subterranean clover can be established. However looked at, the discovery of Subterranean clover as a fodder plant has been a most valuable one for Australia, and on present appearances will be recognised as such in many other countries in the near future, and the labors of Mr. A. W. Howard warrant the thanks of the country.



## DESCRIPTION OF THE PLANT.

Subterranean clover is a prostrate, soft, woolly annual, all parts of which are covered with fairly long, soft hairs. The three leaflets forming each leaf are carried on a long stalk, and each leaflet is heart-shaped and faintly toothed at the summit. The two small appendages growing at the base of the leaf stalks, although bluntly pointed, are almost oval in shape. Clusters of three or four small flowers of a creamy to pinkish color are produced on comparatively short stalks, which spring from the axils of the leaf stalks, and immediately after flowering the stalk carrying the cluster of flowers



*Reproduced from "Fodder Crops for Australia," by Leslie H. Brunning.*

**SUBTERRANEAN CLOVER**—Sod Cut from a Crop Showing Denseness of Growth and the High Proportion of Stems Made by this Plant when Grown in Suitable Conditions.

turns downwards and grows until the seed head is pushed below the surface of the soil. On penetrating the soil the parts of the flower head surrounding the fertile flowers grow sufficiently to "anchor" the seed head in the soil. Each fertile flower produces a one-seeded pod. Although an annual plant, the provision for burying most of its seed makes this clover equivalent to a perennial, and when once established it is practically permanent.

An individual plant in good conditions, and given room for development, will often completely cover the ground enclosed by a circle 6ft. in diameter, the central part of the circle, about 3ft. across, attaining up to 18in. or so in height, with the outer ring, consisting of a mass of runners, lying on the surface of the soil. Where a good stand of plants exists in fields which have been well supplied with phosphatic fertilisers, it is not unusual to have the whole land covered with a mass of luxuriant growth, 15in. to 20in. in height, the bottom 6in. or so consisting of a thick body of intermingled stalks, whilst above that is mainly leaf growth.

## CLIMATIC REQUIREMENTS.

In South Australia Subterranean clover seed germinates with the first autumn rains which are heavy enough for the purpose, and which usually occur in April or early May. The young plants make some growth during the winter period, and by the end of August will have produced a thick mass, about 4in. in height. When the warm weather of spring arrives they grow very rapidly, and remain green and continue growing until really hot weather is experienced, when they dry up. The possession of this characteristic of



making slow growth in winter, rapid growth in spring, and maturing when the hot weather arrives means that full returns from this clover can only be secured in those districts having a cool spring and long growing period, and great success will not be obtained with the crop in those districts where it is compelled to mature quickly. In South Australia most of that part of the country which receives more than 20in. of average annual rainfall has a sufficiently good climate to grow Subterranean clover well. In a general way this plant requires a temperate climate, with fairly heavy rainfall and long growing period to give full returns of fodder, and as it will withstand a fair amount of excessive wet and the ordinary cold of winter really well, *maximum results are secured in those districts receiving from 22in. to 40in. of average annual rainfall, and a growing period of about eight months between the autumn rains and the really hot, dry weather of summer*, providing always that the seed germinates before the cold weather of winter arrives.

#### SOIL REQUIREMENTS.

Subterranean clover appears to be *able to accommodate itself to almost all types of soil*, and, given suitable climatic conditions and sufficient phosphoric acid, will grow well in calcareous and in sour soils, in most clay soils, in all sands, and in peaty soils but *gives best returns in fertile, well-balanced loams possessed of good, natural drainage*. In this State one of the few types of soil in which the clover does not thrive well is the black, clayey soil, forming part of some of the "crab-hole" land of the South-East, but the extent of the country containing this soil type is so limited that it is not worth much consideration.

Much of the value of this clover depends on the fact that, provided phosphoric acid is supplied to the soils, it will grow extremely well on really "sour" soils, whether they be poor, whitish sands, clayey soils containing much ironstone, or really fertile loams. The poorer types of "sour" lands are usually fairly plentiful where heavy annual rainfall and temperate climate are the rule, and it is not an easy matter to produce profits from the ordinary well-known crops on such soils, but Subterranean clover flourishes in them to the exclusion of practically all other plants.

#### TIME OF SEEDING.

Where this clover has become established the *seed germinates with the autumn rains*, makes good root growth during the cold winter period, but does not make strong stem and leaf growth unless the winter is very mild and warm, and on the approach of the warm weather of the Spring season commences to make strong growth, and continues growing rapidly until maturity is reached. If the young plants have not started before the cold weather arrives, the crop does not make the luxuriant stand which follows an early germination, except when an exceptionally long-drawn-out growing season is experienced, and so, for average seasons, it is essential to seed Subterranean clover in the autumn, and, if possible, to have the land prepared beforehand. *The seed should be sown on the first autumn rain* which is sufficiently heavy to lead to the germination of the seed and, if for any reason this cannot be accomplished, it should be seeded as soon as possible, and in every case while the soil is still warm.

#### METHOD OF SEEDING.

The method of seeding Subterranean clover to ensure a good stand varies with the condition of the land, and particularly as to whether it—(a) Was recently under crop; (b) is undisturbed grass land; or (c) is covered with scrub.

*Cropped Land.*—It is much easier to establish this clover on land which is being cropped than in other locations. If it is desired to secure a full stand of clover in the first year, good soil preparation is necessary, and can be secured by ploughing some time between the Spring and Autumn, and thoroughly cultivating so that the soil is worked down to a fine tilth in time for the first seeding rain in the Autumn, say,



by the middle of April. As soon as the land is sufficiently moist to bring about a full germination, the seed should be mixed with a "carrier," and the mixture be drilled in from the manure box of the ordinary seed drill, being careful not to allow the hoes to penetrate the soil to too great a depth. It is better for the seed to be allowed to fall



Photo by E. W. Pritchard.]

**SUBTERRANEAN CLOVER**—Pieces of Stalks Showing Development from Flowers to Seed. (a) Flowers Just Opening on Very Short Flower Stalk. (b) Petals of Flowers Just Drying—Note Increased Length of Flower Stalk. (c) Petals of Flowers Fallen—Flower Stalks Grown to Place Seed Burr in Soil. (d) Seed Burr Soon After Having Reached Soil Surface. (e) Seed Burr Enlarging, Showing Developed Seed Pods.

from the drill tubes on to the roughened surface of the land and be covered by a brush harrow than for it to be drilled in too deeply. In "heavy" soils *shallow seeding is absolutely essential*, whilst in sandy soils less risk of a bad germination is taken, but even then *fin.* should be taken as the maximum depth.



Superphosphate can be used as a "carrier" with which the seed is mixed, and although there is some danger of the germination of the seed being affected injuriously by contact with superphosphate if this latter substance is "new," it appears from the results of some experiments conducted at Roseworthy Agricultural College in 1925 that Subterranean clover seed suffers less than most small agricultural seeds from lying in contact with superphosphate. It is, however, safe to use superphosphate for this purpose only when (a) the superphosphate has been stored for some time and has lost its "freshness," (b) the mixture of seed and superphosphate is made immediately before drilling, (c) the land is sufficiently moist to be in good germinating condition, or (d) the land is quite dry.

Some very good stands of clover have been secured by drilling the phosphatic fertiliser to be used with the crop into the land before seeding, and then broadcasting the seed when the soil is moist enough. Broadcasting the seed after having drilled in the fertiliser generally ensures a good, regular germination, but much more seed is required, and the quantity of seed used per acre being so small makes the even distribution of it rather difficult. If broadcasted on the surface, either by hand, with a broadcasting machine, or from the tubes of a seed drill, it should be covered by pressing it into the soil with a land roller, or, failing this, by going over the land with "brush" harrows, because most of the other farm implements tend to bury this small seed too deeply.

Where full returns are not expected the first year, it can be seeded with some other crop, and on low-priced land of light texture it is sometimes economical to treat the crop in this way. When an oat crop or a wheat crop is being seeded, a small quantity of seed can be mixed with the fertiliser being applied to the cereal. Many of these seeds will germinate and the plants will grow in the cereal crop, producing a lot of seed for the next year, and when a good germination has resulted and the stubble has not been too heavily grazed a very fair stand of clover is usually the result. A fuller germination is often secured on heavy-textured soils if the cereal is drilled in the ordinary way, then the seed broadcasted and covered by a stroke of a "brush" harrow, or by a light rolling. A stand of clover established in a crop must only be very lightly grazed the year after the crop is harvested.

In light-textured soils and in exposed situations the young Subterranean clover plants can get the protection which is so necessary to their well-being if the mixture of seed and fertiliser is drilled into a cereal stubble through a disc drill.

Extremely good first-year pastures are being secured by establishing the clover in conjunction with Wimmera Rye Grass (*Lolium subulatum*) by drilling into well-cultivated land a mixture of Superphosphate and the two kinds of seeds.

*Grass Land.*—In some circumstances fairly good stands of Subterranean clover have been secured by seeding into land without any preparatory cultivation, but this has largely been so in soils of such light texture that the hoes or discs of the seed drill will make shallow furrows when run over the ground. Even then, the drill is followed by a light harrow of some kind to make certain that the seed is covered. In this case, to give the clover plants a proper chance to compete with the plants already occupying the land, the seed should be put in before the first autumn rain, while the soil is still dry, and plenty of seed and superphosphate must be used. A really good stand cannot be expected until the second or third year after seeding when established in this way. Although some success has resulted from seeding direct into grass land, much effort and seed has been wasted by attempting this method of establishing the crop, and the experience of the last few seasons has all been in favor of loosening the surface soil in some way so that the seed can be covered at seeding time. In heavy-textured soils a couple of trips with a disc cultivator after rains in the Summer or early Autumn will



loosen the immediate surface sufficiently to enable a disc drill, followed by a "brush" harrow, to deposit the seed in the soil and cover it over. In sandy land harrows will usually do all that is necessary before the seed is drilled in.

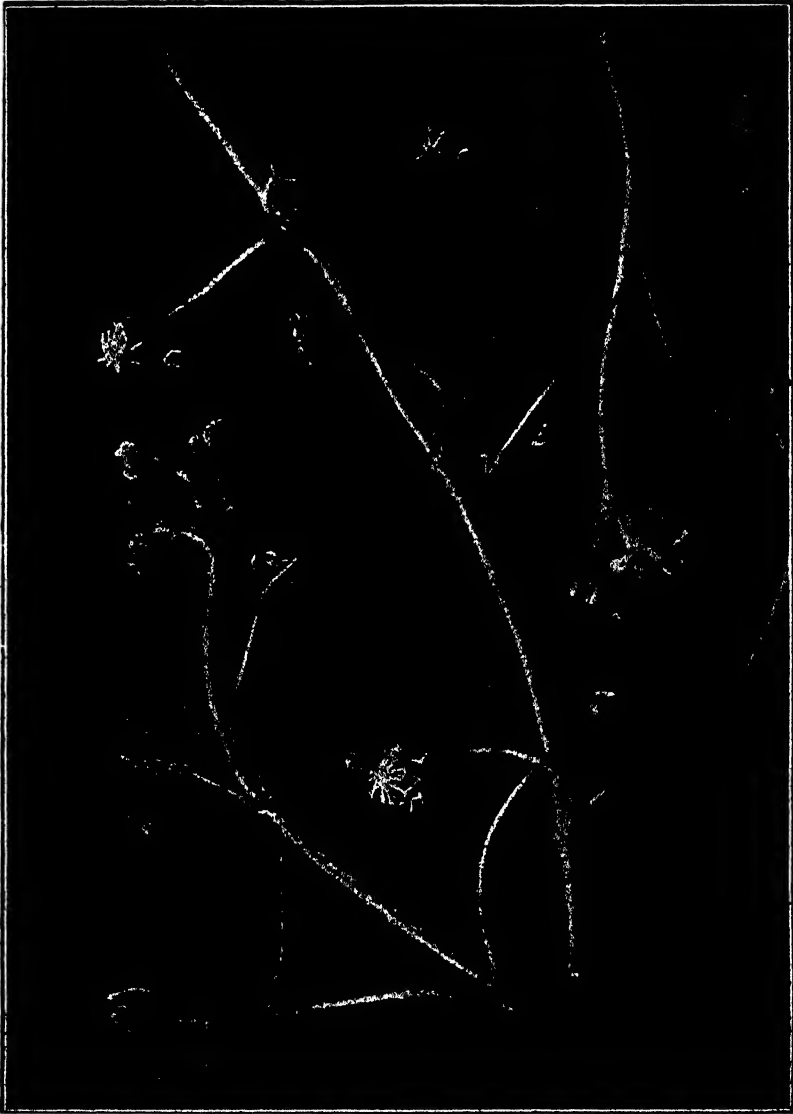


Photo by E. W. Pritchard.]

**SUBTERRANEAN CLOVER**—Portions of Stalks Showing General Hairiness of Plant, and the Development of Flowering Parts to "Anchor" Seed in the Soil. (a) Flower Head in Bloom. (b) Flower Stalk Extended in its Search for the Soil Surface Immediately after Completion of Flowering. (c) Flower Head which has Just Touched Soil Surface, Showing Commencement of Characteristic Development of Parts of Flower Head which "Anchor" the Seed Burr to the Soil. (d) Seed Head, Showing Further Growth of Flowering Parts. (e) Fully Developed Seed Burr as "Anchored" to Soil.

**Scrub Land.**—Subterranean clover can be established on scrub land in those locations suitable to the crop at a lesser cost than can any other luxuriant-growing fodder plant we have experience with in this country, but of course the original preparation for the crop differs according to the type of scrub to be handled. Where cereal crops are to



be grown during the period of establishing the clover, the land must be fairly well cleared and be properly ploughed and cultivated before drilling in the cereal. Under this system of establishment, it is common experience to find difficulty in securing a good stand of clover on these raw scrub soils unless at least two cereal crops are grown before introducing the clover seed. The clover seed can then be seeded with the third cereal crop or in the stubble of the second, as described above for seeding cropped land. If the scrub land is to be converted into Subterranean clover pasture without the help of other crops, success is dependent on leaving as much organic matter as possible on the surface of the land, and in scratching the surface in some way so that the seed can be covered. Most of the "gum" country has very little under-scrub, and clover can here be easily established by cutting off the small trees, ring-barking the larger ones, scratching the surface of the soil with a cultivator, spiked log, or such-like implement, drilling in seed and fertiliser, and "brush" harrowing. In "stringy-bark" scrub, the trees should be ringbarked, yaccas and large bushes grubbed, scrub burnt, surface of soil scratched about with a spiked log or such-like implement, which also breaks off and uproots much of the small scrub, seed and fertiliser drilled with a disc drill, or broadcasted, and the whole then "brush" harrowed. Where there is thick but stunted scrub, such as is to be found on a fair amount of our ironstone country, it should be rolled down and burnt, and either be seeded then or be allowed to stand for a year. In the former case the surface must be scratched and the seed covered after sowing, whilst if left for a year the use of a spiked log of some kind before seeding is almost essential, as it breaks off the shoots as well as scratching the surface of the land. The one-year-old shoots and scrub knocked down should on no account be burnt, but should be left to dry on the surface of the land, where they will act as a shelter for the young clover plants, which grow after seed has been drilled through a disc drill or broadcasted. Probably the best way to establish clover in heathy scrub is to plough the land—scrub and all—with a heavy disc plough; grow a couple of Oat crops in succession, either to be harvested or grazed by livestock, then to seed the land with clover after the second Oat crop. Once Subterranean clover has been established on scrub land it is necessary to keep down the scrub growth, and for the purpose a heavy spiked log or triangle-shaped implement specially made with railway lines to which strong spikes are fixed does the job fairly well, and at the same times does good by scoring the surface of the soil.

When establishing the crop it must be remembered that full returns will only be secured if the seed is covered, and when there is plenty of organic matter on the surface of the land, the first year's results are better than if the land is bare, because the young plants get protection which enables them to grow strongly from germination onwards.

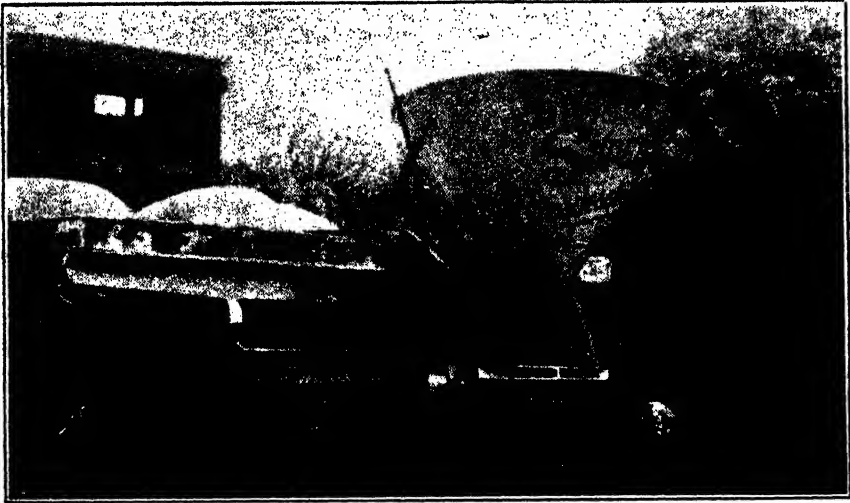
#### RATE OF SEEDING.

Recent experience has firmly established the fact that if a good stand of clover is to be secured in a short while, plenty of seed must be used, and where small quantities are sown it usually takes about three years to have a full stand. To establish this clover properly in the year of seeding, even on land that has been thoroughly prepared after having carried other kinds of crops in previous years, from 6lbs. to 8lbs. of seed should be used. When the seeding is done in a cereal crop, on low-priced land, 2lbs. to 3lbs. of seed are necessary. Grass land requires 6lbs. to 8lbs. of seed drilled in the early autumn. On scrub land being directly converted into pasture, about 10lbs. of cleaned seed should be used, or else a mixture of 4lbs. or 5lbs. of cleaned seed and 15lbs. to 20lbs. of rubbishy seed as screened off at the threshing machines. This rubbishy seed consists of a little clean seed, many unthreshed clover burrs, grass seeds, and seeds of most other forage plants growing in the clover fields, and the introduction of these other plants to scrub lands where practically no edible plants exist, helps to build up the pasture more quickly than if only cleaned clover seed is sown.



## MANURING THE CROP.

As with all plants which make rapid, luxuriant growth, Subterranean clover gives best returns when liberally supplied with all the necessary plant foods, but perhaps better than most other cultivated plants it appears to have the power of extracting from almost any type of soil its requirements of other plant foods *when its needs as regards phosphoric acid are adequately met*. In all soils found in those parts of South Australia which have suitable climatic conditions for the growth of this crop, with the exception



**TOP-DRESSING SUBTERRANEAN CLOVER**—Broadcaster attached to a Motor Lorry for Top-Dressing Pasture, and for Broadcasting mixtures of Superphosphate and Subterranean Clover Seed.

of more or less white sands, the equivalent of at least 1cwt. Superphosphate (45 per cent.) should be applied per acre per year, and in all places where the soils are fertile, and the rainfall exceeds 25in. on the average, this annual dressing could be economically increased to one bag or even 2cwts. Superphosphate (45 per cent.) per acre.

The following figures, secured at Kybybolite Experimental Farm, where the average rainfall is 21.86in., are the actual grazing results from the manured Subterranean clover fields, and are the averages of the four seasons from 1925 to 1928:—

*Subterranean Clover Pastures, Kybybolite, 1925-1928.*

| Manuring per Acre.                                                                   | Grazing.<br>Sheep<br>per Acre. | Increase<br>over<br>No Manure. |
|--------------------------------------------------------------------------------------|--------------------------------|--------------------------------|
|                                                                                      |                                | Sheep<br>per Acre.             |
| 1. Annual dressing of 1cwt. 45% super ....                                           | 3.85                           | 2.05                           |
| 2. Single dressing of 6cwts. Ephos phosphate                                         | 3.73                           | 1.93                           |
| 3. Single dressing of 4cwts. Island phosphate<br>and 1cwt. 45% super .....           | 3.73                           | 1.93                           |
| 4. Single dressing of 4cwts. Island phosphate<br>and annual dressing of potash ..... | 3.49                           | 1.69                           |
| 5. Single dressing of 1 ton lime and annual<br>dressing of 1cwt. 45% super .....     | 3.49                           | 1.69                           |
| 6. Annual dressing of 90lbs. 45% super ....                                          | 3.45                           | 1.65                           |
| 7. Single dressing of 4cwts. Island phosphate                                        | 3.08                           | 1.28                           |
| 8. Annual dressing 45lbs. 45% super ....                                             | 2.71                           | 0.91                           |
| 9. Annual dressing 37lbs. 90% potash .....                                           | 2.38                           | 0.58                           |
| 10. No Manure .....                                                                  | 1.80                           | —                              |



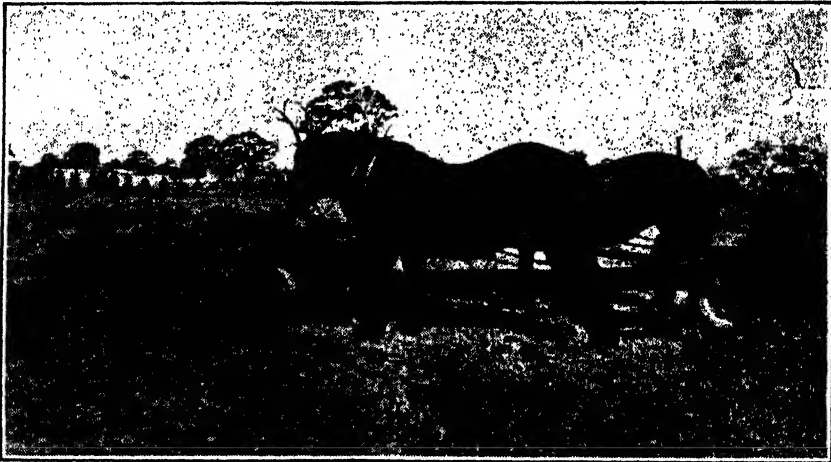
At present prices, the cheapest way to supply the necessary phosphatic fertiliser would be to dress the land at the rate of 1cwt. Superphosphate (45 per cent.) and 10cwt. finely ground raw Rock-phosphate (82 per cent.) per acre once every 12 years, and it would probably prove more satisfactory than applying a bag of Superphosphate (45 per cent.) per acre every year. The disadvantage of adopting this method of manuring is that the initial cost of the dressing is high, and a lot of money is locked up in the land, whereas with Superphosphate dressings it becomes an annual outlay.

It must be remembered that *it is almost impossible to grow Subterranean clover successfully unless plenty of phosphatic fertiliser is applied to the crop*, and even in the best of soils a very marked improvement to the clover crop follows every application of phosphate. All fertilisers applied to this crop should be put into the land in the autumn before the first rains have fallen, say, in March or early April.

#### USES OF THE CROP.

Subterranean clover is *mainly grown to be grazed in the green state*, but it can be converted into a very attractive and palatable hay, and is a really good "dry" feed if left to mature in the field before being grazed by livestock.

As green feed it tends to "blow" the ruminants (cattle and sheep) if they are turned on to it when wet, particularly if the animals have left a different type of fodder, but this is a recognised disadvantage of practically all leguminous fodders when green, and the danger is eliminated, or at all events lessened, by allowing the livestock



**SUBTERRANEAN CLOVER HAY**—Push Rake used to take the Clover Hay to the Hay Press.

to become accustomed to it gradually. In this stage it is a remarkably good milk producer with cows, a great fattener of cattle, sheep, and horses, and pigs do really well on it.

A good deal of care is necessary in converting the crop into hay, because it carries a very high proportion of leaf, and is at its maximum of growth before the hottest part of the summer has arrived, with the consequent danger of rain wetting the partly-cured material, so sometimes necessitating much handling. When well cured, however, the hay is much relished by all farm livestock, and they will all fatten very readily when fed with it. That this hay is of good quality is easily seen by a glance at the following table showing the analyses of three Subterranean clover hays in comparison with hays made from Lucerne and Clustered clover.



The figures representing the Starch Equivalent of each hay shows that all of the Subterranean clover hays are better than the other hays with which they are being compared:—

*Analyses and Starch Equivalence of Leguminous Hays.*

| Hay.                                | Nutrients. | Moisture.<br>% | Ash.<br>%                | Protein.<br>% | Fibre.<br>% | Fat.<br>% | Carbo-<br>hydrates. |
|-------------------------------------|------------|----------------|--------------------------|---------------|-------------|-----------|---------------------|
| <i>Lucerne—1927-8—</i>              |            |                |                          |               |             |           |                     |
| Messrs. Morphett & Co., Woods Point | Crude      | 10.93          | 8.89                     | 14.50         | 26.72       | 1.69      | 37.27               |
|                                     | Digestible | —              | —                        | 11.02         | 11.22       | 0.78      | 25.84               |
|                                     |            |                | Starch equivalent—32.91. |               |             |           |                     |
| <i>Lucerne—1927-8—</i>              |            |                |                          |               |             |           |                     |
| Mr. F. O. H. Martin, Woodside ..    | Crude      | 8.26           | 7.08                     | 14.43         | 28.96       | 1.73      | 39.54               |
|                                     | Digestible | —              | —                        | 10.97         | 12.16       | 0.80      | 26.89               |
|                                     |            |                | Starch equivalent—34.09. |               |             |           |                     |
| <i>Subterranean Clover—1927-8—</i>  |            |                |                          |               |             |           |                     |
| Mr. F. O. H. Martin, Woodside ..    | Crude      | 10.39          | 8.21                     | 11.37         | 23.46       | 2.32      | 44.25               |
|                                     | Digestible | —              | —                        | 7.39          | 10.32       | 1.16      | 29.20               |
|                                     |            |                | Starch equivalent—35.08. |               |             |           |                     |
| <i>Subterranean Clover—1928-9—</i>  |            |                |                          |               |             |           |                     |
| Kybybolite .....                    | Crude      | 10.64          | 9.85                     | 11.40         | 18.71       | 1.75      | 47.65               |
|                                     | Digestible | —              | —                        | 7.41          | 8.23        | 0.87      | 31.45               |
|                                     |            |                | Starch equivalent—37.46. |               |             |           |                     |
| <i>Subterranean Clover—1928-9—</i>  |            |                |                          |               |             |           |                     |
| Mount Barker .....                  | Crude      | 9.60           | 8.95                     | 12.49         | 18.83       | 2.30      | 47.83               |
|                                     | Digestible | —              | —                        | 8.12          | 8.29        | 1.15      | 31.57               |
|                                     |            |                | Starch equivalent—38.77. |               |             |           |                     |
| <i>Clustered Clover—1928-9—</i>     |            |                |                          |               |             |           |                     |
| Mount Gambler .....                 | Crude      | 9.15           | 8.74                     | 11.37         | 23.37       | 1.72      | 45.65               |
|                                     | Digestible | —              | —                        | 7.39          | 10.28       | 0.86      | 30.13               |
|                                     |            |                | Starch equivalent—35.45. |               |             |           |                     |

The starch equivalent for each hay has been calculated by Kellner's formula, and is a practical way of comparing foodstuffs of the same kind when to be used for fattening or maintenance purposes.

Where any considerable quantity of hay is to be made, the most economical way to do it appears to be to press it into bales in the field where grown. The crop should be cut with a mower when it begins to show signs of maturing, which is usually early in November, and should be "cocked" with a horse-rake on the same day. It should be taken to the hay-press by push-rakes as soon as cured and put straight into bales,



**SUBTERRANEAN CLOVER HAY—Pressing the Clover Hay into Bales**

which can be stacked away at once. For smaller quantities the hay should be stored in stacks. The crop should be cocked immediately it is ready, cocked within a few hours, and carted to stack as soon as it can be put away without danger of firing the stack. If water can be squeezed from the hay when a handful from the centre of the cock is tightly twisted by hand, it is not sufficiently dry to stack with safety.



If allowed to stand in the field until dry it is still greedily eaten by livestock, and despite changes in the weather and much wetting and drying it remains a most useful and estimable feed, and in this respect is much more valuable than most other of our fodder plants if left to become dry. After livestock have eaten the leaves and dry stems, they continue to do well on this crop by searching for and devouring much of the rather enormous amount of seed left at and near the surface of the ground.

Besides producing luxuriant feed for the farm livestock, Subterranean clover is a really *good soil renovator*, helping in the collection of much nitrogen by the bacteria living on its roots, and increasing the organic matter by leaves and stems dropped and trampled into the land whilst being grazed.

It is also a rather *wonderful cleaner of the soil*, for when growing well there are hardly any of the ordinary weeds found on our farmed lands which it will not choke right out. This is particularly noticeable in the case of that almost useless weed which occupied so much of the land where this clover will grow well, namely, Sorrel, which is choked out by the Subterranean clover.

#### HANDLING THE CROP.

Being possessed of prostrate stems and the power of burying its seed, Subterranean clover is enabled to *withstand much heavier grazing* than will almost any other annual fodder crop, and for that matter more than many of the perennial fodders. Nevertheless, the more care shown with the crop the greater will be the grazing results. During the winter period the crop should not be fed too close, because the more growth left on the plants at this time the greater will be the root development, and so the more rapid and more bulky the growth made when the warm weather arrives. Once the rapid growth has started livestock can be turned on to the crop, remembering that best returns can only be secured if the crop is fed off rapidly and not too close, then the livestock removed and kept off until there is sufficient growth to be a good "bite" for the animals. *Rapid feeding off and resting the pasture will give the greatest success* and can only be attained in practice by having small fields, and given this, good Subterranean clover should be capable of carrying the equivalent of 6 to 8 sheep per acre per year. At the end of the season the crop should not be fed off too close, because livestock soon learn to "stamp" for the seed, and if the land is laid bare and is then scratched by livestock, much seed will be washed from the soil, should the first autumn rain be a heavy one. Moreover, the presence of plenty of undecomposed organic matter on the surface of the land, enables clover plants which germinate in the early autumn to make much stronger growth before the winter than do plants on barer ground, and they withstand dry periods much better than those not so protected. It is in fields where plenty of clover runners have been left that good winter feed is produced the next year by Subterranean clover, whereas in those places where it is grazed right out very little is produced until well into the following spring.

If the clover fields are to receive an annual application of phosphate, rather than a heavy dressing occasionally, this should be applied in the autumn before the rains have started, say, in March or early April, either by running the drill with the hoes in the ground, or by broadcasting it on the surface and then harrowing it in.

*Clover fields should be cultivated or harrowed each year* to distribute the droppings of animals and the residues of the plants, and should be done in the autumn before sufficient rain has fallen to germinate any of the seed.

Where a rather thin stand of the clover exists, it should be only lightly grazed, leaving at the end of the season noticeable clumps of clover, and during the autumn should be harrowed two or three times to make sure that seed is dragged on to the bare patches.



If another type of crop is required from land growing Subterranean clover it can be grown without any danger of eradicating the clover, and after one such crop ample seed of the clover is left to give a full stand in the next season. Two successive crops grown on clover land will not destroy all of the seed, but when left out the clover stand is naturally rather thin, and if a full crop is required a little clover seed should be sown after the second crop has been removed.

All Clover fields should be provided with water in troughs, and livestock grazing on the clover should not have access to any other water. Wherever this practice is followed the animals make better use of the available feed and keep much healthier.

#### HARVESTING THE SEED.

No difficulty is experienced in harvesting seed which is to be used on the farm where grown. This is not so, however, for the collection and preparation of seed for market. Crops to be kept for seed are not grazed, or, if so, only lightly in the early Spring, but are allowed to grow until quite mature. When ripe the crop is raked, with a horse rake if only a limited amount of seed is required, but with hand rakes if large quantities are desired. A horse rake will collect about one-half of the seed that would be gathered



**SUTERRANEAN CLOVER HAY**—Illustration showing the high yields of Hay that can be expected from Subterranean Clover when properly grown in suitable localities.

by hand rakes from a given area. If a power thresher is available, the raked up material is passed through it, which separates the seed burrs from the stems, but if no thresher is to be used the mass is passed through a chaffcutter and the burrs winnowed from the stalks. Although some of the seeds are removed from their coverings by these methods, they constitute only a comparatively small proportion of the burrs, and the mass would not be readily saleable. Still, for one's own sowings, these burrs, if well cleaned, are nearly as good as the hulled seed, and will be fairly evenly distributed from the manure box of the drill if mixed with super., remembering that about three to four times as much unhulled seed is required as is needed if properly cleaned seed is used.

In preparing the seed for market the seed pods and burrs must be treated in a hulling machine, made specially for the treatment of this species of clover, in which all outer coverings of the seed are removed.



## PESTS OF THE CROP.

Although Subterranean clover has been grown as a fodder crop in South Australia for over 30 years now, the only pest doing noticeable damage to it is the Lucerne Flea (*Smynturus viridis*), and, although the hordes of this small insect, which appear in the early Spring, play havoc with the crop, they are only present for a short while, disappearing as the weather warms up, and the crop very quickly recovers from their attack. A grazing crop of clover affected by this pest should be rapidly fed off by livestock, and if the insects were still present when sufficient growth had been made to enable livestock to graze it, the animals should again be put on the stand. It may sometimes pay to spray an affected crop which was required for seed, using a weak solution of an arsenical spray, or soap and tobacco spray, or an oil emulsion, and if the spray was applied at night, when the insects are most active, better results would possibly be secured.

It appears that in Western Australia, the Red-legged Earth Mite (*Penthaleus destructor*) does damage to the Subterranean clover crop in certain locations, but although this pest has been known to be present in this State for some time, no complaints have been received in connection with attacks on clover crops.

## SUBTERRANEAN CLOVER IN MIXTURES.

The prostrate habit of Subterranean clover and its strong and rapid growth lead to the smothering out of most other plants growing on the same land; still, it will grow well in conjunction with any of the true grasses which start to make their Spring growth a little sooner than does the clover. The best of the grasses for this purpose are Perennial Rye Grass and Wimmera Rye Grass. Of necessity, a mixture of Perennial Rye Grass and the clover would only be attempted on really fertile soils, but on the poorer types of soil clover alone would be grown, or it could be mixed with Wimmera Rye Grass. Drained peat land or rich valley bottoms could be seeded with 4lbs. Subterranean clover and 20lbs. Perennial Rye Grass per acre if a good mixture was required, and would produce an enormous quantity of really good pasture. A mixture of 4lbs. Subterranean clover and 10lbs. of Wimmera Rye Grass seed makes a good stand of pasture, and after the first season produces much more Winter feed than can be secured from Clover alone, and the presence of the Wimmera Rye Grass does not retard the Spring growth of the Clover.

Although the Wimmera Rye Grass is only an annual, it persists when grown in conjunction with the clover, and at Kybybolite Experimental Farm some fields seeded to the mixture in 1924 still contain plenty of the grass.

## SUMMARY.

1. Subterranean clover, although known as a roadside weed in Europe for a long time, has been proved in South Australia to be a really *high-class fodder plant*, and this result is almost wholly due to the efforts of the late Mr. A. W. Howard, of Mount Barker, South Australia.
2. The power of burying its seed below the soil surface renders Subterranean clover *equivalent to a perennial*.
3. Individual plants of Subterranean clover will possibly cover the whole of a circle 6ft. in diameter, whilst a good stand of plants will cover the whole land with a dense mass of growth from 12in. to 20in. in height.
4. Subterranean clover requires a temperate climate with fairly heavy rainfall (22in. or more of average annual rainfall), and a long growing period (eight months between Autumn rains and hot, dry weather) to produce maximum returns.
5. Almost all types of soil will produce Subterranean clover *well*.
6. Much of the value of this clover depends on the fact that it will *grow well on really "sour" soils*, provided that plenty of phosphoric acid is supplied to the land.



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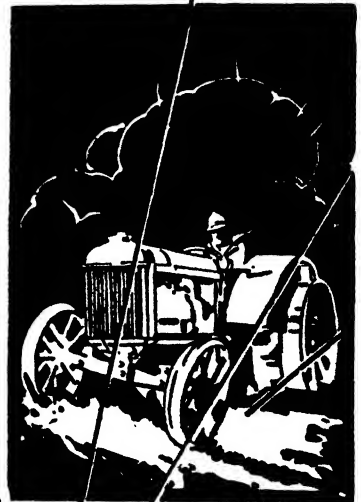
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7. The seed must be sown in time to germinate before the cold weather of winter sets in.

8. The seed can be drilled into the soil, or else be broadcasted on the surface and then worked into the land, but shallow seeding is essential. Good soil preparation is necessary if a proper stand is required in the first year, but the seed can under some circumstances be sown with another type of crop.

9. Before seeding grass land, the surface of the soil should be lightly cultivated, so that the seed can be covered with a "brush" harrow when drilled in or broadcasted on the surface.

10. Scrub land should be ploughed, cultivated, and made to carry a couple of crops of cereals before being seeded to Subterranean clover, or else the surface should be scratched with a spiked log or such-like implement, and a mixture of seed and manure be drilled or broadcasted, then "brush" harrowed.

11. It is essential that the seed be covered when establishing the crop, and the more organic matter on the surface at the time of seeding the better will be the first-year crop.

12. To secure a full stand on cropped land the year of seeding, from 6lbs. to 8lbs. of seed should be used. When sown with a cereal crop 2lbs. to 3lbs. of seed should be used. Grass land should be seeded with 6lbs. to 8lbs. of seed in the early autumn, before the first rain. Scrub land should have 10lbs. of cleaned seed, or a mixture of 4lbs. or 5lbs. of cleaned seed and 15lbs. to 20lbs. of rubbishy seed, applied per acre.

13. It is almost impossible to grow Subterranean clover well in the soils of districts with temperate climate unless plenty of phosphatic fertiliser is used, and for high returns the equivalent of from 1 bag to 2cwts. of superphosphate (45 per cent.) per acre per year should be applied. At present the application of 1cwt. of superphosphate (45 per cent.) and 10cwts. of finely-ground raw rock phosphate (82 per cent.) per acre once every twelve years is possibly the cheapest way to apply the phosphoric acid. All manuring should be done in the early autumn.

14. Subterranean clover can be used with advantage by livestock when green, as hay or as "dry" feed.

15. Analyses of Subterranean clover hays show this foodstuff to be high-class fodder, at least as good as Lucerne hay.

16. Probably the most economical way to make large quantities of hay is to cut with the mower, and, when cured, take to hay-press with a push-rake and put it straight into bales.

17. This clover is a *good soil renovator*, helping in the collection of much nitrogen, and increasing the organic matter content of the soil. It is also a *good soil cleaner*, choking out most of the ordinary farm weeds.

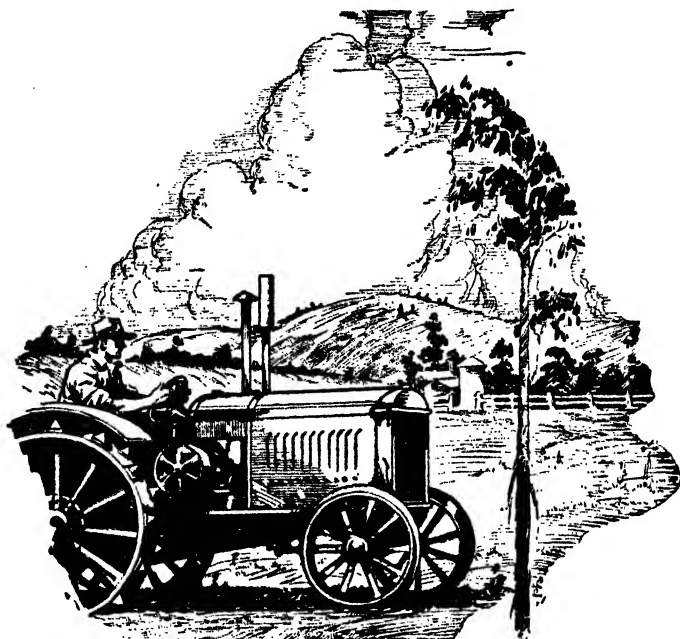
18. Subterranean clover should be grown in small fields, so that it can be fed off rapidly, then rested until again ready for livestock. Clover fields should be cultivated or harrowed each year in the early autumn. Thin stands should be harrowed two or three times in the early autumn to ensure that seed is spread on to the bare patches. Clover fields will allow of a crop of another kind being grown for one year without affecting the clover stand.

19. In collecting seed the crop is raked up, threshed, and then hulled in a machine made specially for the purpose.

20. Lucerne Flea is the only pest doing much damage to the Subterranean clover crops, but then only to "seed" crops, because the pastures are fed down heavily each time that they are attacked.

21. Subterranean clover will grow well in admixture with the Rye grasses on those soils suitable for these grasses.





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## ROSEWORTHY AGRICULTURAL COLLEGE.

SEVENTH REPORT ON THE PERMANENT FIELD EXPERIMENTS,  
SEASONS 1904-1928.

[By W. R. BIRKS, B.Sc. (Agric.), Principal, and T. A. Cole, D.D.A., Experimentalist.]

(Continued from page 1050, July, 1930.)

14. *Crop Rotation Experiments.*

A number of rotations, introducing a variety of crops, have been tested over varying periods since the inception of the Experiments. Modifications in the plan of these tests have amounted to a gradual elimination of the more complex rotations and of all crops other than the cereals usually grown locally. Thus, at the time of the last report (1915) there were in operation, beside the standard Fallow-Wheat series, six rotations, viz., Sorghum-Wheat, Fallow-Wheat-Pasture, Fallow-Wheat-Lucerne-Lucerne-Lucerne, Pease-Wheat-Kale-Barley, Fallow-Wheat-Barley, and Fallow-Wheat-Pease-Wheat-Barley. These latter six series were closed in 1922 and after the interruption caused by the wet season of 1923, a fresh group of experiments was opened in 1924 with a re-grouping of the plots. The new series, which are still current, include the relatively well-established local rotations, viz., Fallow-Wheat-Barley, Fallow-Wheat-Oats, Fallow-Wheat-Barley-Pasture, and Fallow-Wheat-Oats-Pasture.

(a) *Fallow-Wheat.*—This system of growing wheat represents a practice commonly met with in certain districts, especially in cases in which wheat growing is the principal source of revenue and where maximum immediate returns are sought.

The pair of plots (10 and 11), in which this rotation is exemplified, moreover, have been so treated since the inception of the experiments. The results obtained from them, therefore, provide a useful basis of calculation and comparison.

In the next Table are shown the details of grain and total produce returns since 1915, together with other relevant data and mean yields. Results for 1923 and 1928 are not recorded; the former on account of the excessive wet preventing seeding and the latter on account of damage by livestock.

TABLE XL.—*Showing Harvest Returns from Wheat Grown Continuously after Bare Fallow, with 1cwt. Superphosphate per Acre, 1905-27.*

| Year.                      | Total Produce<br>per acre. |    |    | Grain<br>per acre. |      | Straw to<br>60lbs. of grain<br>Lbs. | Bushel<br>weight.<br>Lbs. |
|----------------------------|----------------------------|----|----|--------------------|------|-------------------------------------|---------------------------|
|                            | T.                         | C. | L. | Bush.              | Lbs. |                                     |                           |
| 1916 .....                 | 2                          | 0  | 25 | 19                 | 57   | 166                                 | 62½                       |
| 1917 .....                 | 2                          | 0  | 35 | 19                 | 56   | 167                                 | 62                        |
| 1918 .....                 | 1                          | 3  | 20 | 17                 | 14   | 91                                  | 62½                       |
| 1919 .....                 | 0                          | 14 | 62 | 10                 | 25   | 96                                  | 62½                       |
| 1920 .....                 | 1                          | 10 | 98 | 16                 | 5    | 155                                 | 61½                       |
| 1921 .....                 | 1                          | 3  | 66 | 12                 | 23   | 153                                 | 57                        |
| 1922 .....                 | 1                          | 6  | 93 | 15                 | 5    | 139                                 | 63                        |
| 1924 .....                 | 1                          | 2  | 53 | 12                 | 30   | 141                                 | 63                        |
| 1925 .....                 | 2                          | 5  | 46 | 24                 | 30   | 148                                 | 63                        |
| 1926 .....                 | 1                          | 12 | 36 | 14                 | 29   | 190                                 | 62½                       |
| 1927 .....                 | 0                          | 18 | 97 | 10                 | 52   | 134                                 | 58                        |
| Means for 22 seasons ..... | 1                          | 12 | 56 | 18                 | 28   | 142                                 | 62                        |
| Hay equivalent .....       | 1                          | 19 | 71 | —                  | —    | —                                   | —                         |

This gives a mean gross return of £4 3s. 1d. per acre for grain and £4 19s. 1d. for hay returns. In order to arrive at a net value for these returns, for the purpose of comparison, arbitrary figures, representing items of cost of production, have been



adopted as follows:—Rental value of the land, 10s. per acre per annum; cost of fallowing, seeding, and harvesting operations, including costs of seed and manure, &c., £2 10s. per acre. Making deductions for two years' rental, plus cost of field operations, we thus arrive at the mean net figures of 13s. 1d. per acre of crop for grain and £1 9s. 1d. per acre for hay returns. Spreading these returns over the whole area occupied by the rotation we get the mean net returns per acre of 6s. 6d. and 14s. 6d. for grain and hay respectively.

These figures emphasise the more remunerative returns to be expected from hay growing, where hay can readily be disposed of, than from wheat marketed as grain. The marked difference in the case of these tests is associated, no doubt, with the high proportion of straw to grain recorded in the above Table. The mean grain yield represents only 30 per cent. of the total produce, a relatively low proportion which in its turn is a result, no doubt, of our severe Spring and early Summer conditions, which not infrequently force a more or less premature ripening and shrivelling of the grain.

To the figures representing net crop returns must be added the value of sheep grazing provided by the fallow, the stubbles, and Winter growths. The first of these items is assumed, from previously recorded results, to be represented by the equivalent of .25 sheep per acre for a year: the other two (stubble and Winter grazings) have been recorded in the plots and details since 1916, together with mean results since 1907, are shown in the next Table.

TABLE XLI.—*Showing the Grazing Capacity of Land Alternately Fallowed and Sown to Wheat, Expressed as Sheep per Acre for a Year, 1907-28.*

| Year.                      | Fallow<br>Grazing. | Stubble<br>Grazing. | Winter<br>Grazing. | Total<br>Grazing. |
|----------------------------|--------------------|---------------------|--------------------|-------------------|
| 1916 .....                 | .25                | .89                 | .11                | 1.25              |
| 1917 .....                 | .25                | .36                 | .20                | .81               |
| 1918 .....                 | .25                | .42                 | .00                | .67               |
| 1919 .....                 | .25                | .33                 | .00                | .58               |
| 1920 .....                 | .25                | .54                 | .30                | 1.09              |
| 1921 .....                 | .25                | .64                 | .31                | 1.20              |
| 1922 .....                 | .25                | .74                 | .37                | 1.36              |
| 1923 .....                 | .25                | .57                 | .00                | .82               |
| 1924 .....                 | .25                | .00                 | .37                | .62               |
| 1925 .....                 | .25                | .40                 | .00                | .65               |
| 1926 .....                 | .25                | .64                 | .22                | 1.11              |
| 1927 .....                 | .25                | .64                 | .00                | .89               |
| 1928 .....                 | .25                | .33                 | .00                | .58               |
| Means for 22 seasons ..... | .25                | .48                 | .23                | .96               |

At the adopted value for sheep grazing (12s. 6d. per sheep per annum), this gives a mean value for total grazing of 12s. for the whole area covered by the test, or 6s. per acre per annum.

Adding this value to the net returns from cropping, we arrive at the figures 12s. 6d. and £1 0s. 6d. (for wheat farming and hay growing respectively) representing the probable net returns per acre per annum from a farm worked wholly on the fallow-wheat rotation. The figures cannot be taken as representing the actual financial results of farming operations in practice, as certain overhead and managerial expenses have not been taken into account: they do, however, provide a basis of comparison for the results of other rotational tests which are calculated in a similar way.

(b) *Sorghum-Wheat*.—This rotation was in force in a pair of plots (12 and 13), adjoining those considered in the foregoing paragraph, from 1905 to 1922. The object of this test is to compare the value of the extra grazing provided by the sorghum, with the value of the wheat or hay sacrificed in the succeeding crop as a result, no doubt, mainly of the depletion of soil moisture during the growing period of the sorghum.

In the next Table the results from the Sorghum-Wheat rotation are shown in comparison with those of the Fallow-Wheat rotation for the corresponding period. Total grazing returns are included and the differences shown, generally to the credit of the



Sorghum-Wheat rotation, are due almost entirely to the difference between the mean fallow grazing figure (.25 sheep for a year) and the extra grazing provided by the sorghum during the Summer and early Autumn preceding wheat seeding.

TABLE XLII.—Showing Crop Returns and Total Grazing Provided in Fallow-Wheat and Sorghum-Wheat Rotations, 1906-1922.

| Year.                | Fallow-Wheat Rotation. |    |            |                    |                                        | Sorghum-Wheat Rotation. |            |    |                    |                                        |
|----------------------|------------------------|----|------------|--------------------|----------------------------------------|-------------------------|------------|----|--------------------|----------------------------------------|
|                      | Total                  |    |            | Grain<br>per Acre. | Total<br>Grazing<br>Sheep<br>per Acre. | Total                   |            |    | Grain<br>per Acre. | Total<br>Grazing<br>Sheep<br>per Acre. |
|                      | Produce                |    |            |                    |                                        | Produce                 |            |    |                    |                                        |
|                      | per Acre.              |    |            |                    |                                        | per Acre.               |            |    |                    |                                        |
| T.                   | C.                     | L. | Bush. lbs. | T.                 | C.                                     | L.                      | Bush. lbs. |    |                    |                                        |
| 1916                 | 2                      | 0  | 25         | 19 57              | 1.25                                   | 2                       | 3          | 72 | 24 50              | 1.82                                   |
| 1917                 | 2                      | 0  | 35         | 19 56              | .81                                    | 1                       | 14         | 1  | 12 41              | 1.60                                   |
| 1918                 | 0                      | 10 | 29         | 17 41              | .67                                    | 0                       | 11         | 95 | 4 13               | 1.34                                   |
| 1919                 | 0                      | 16 | 42         | 10 25              | .58                                    | 0                       | 16         | 5  | 10 24              | 1.12                                   |
| 1920                 | 1                      | 10 | 98         | 16 5               | 1.09                                   | 1                       | 14         | 4  | 20 44              | 1.39                                   |
| 1921                 | 1                      | 3  | 66         | 12 23              | 1.20                                   | 1                       | 0          | 39 | 11 0               | 1.50                                   |
| 1922                 | 1                      | 6  | 93         | 15 6               | 1.36                                   | 1                       | 6          | 80 | 14 50              | 1.90                                   |
| Means for 17 seasons | 1                      | 11 | 42         | 17 58              | .97                                    | 1                       | 8          | 16 | 14 57              | 1.43                                   |
| Hay equivalent       | 1                      | 18 | 29         | —                  | —                                      | 1                       | 14         | 36 | —                  | —                                      |

From these figures it appears that the introduction of sorghum as a fallow crop has been responsible for an increase in grazing value equivalent to approximately  $\frac{1}{4}$  sheep per acre over the whole area and also for a loss in the wheat crop returns of 3cwt. 105lbs. of hay, or 3bush. 1lb. of grain. In order to appraise the net result more clearly, a statement of receipts and expenditure is set out in the next Table. The arbitrary cost figures previously referred to are embodied in this, and in addition 8s. per acre is included to represent the cost of sorghum seed (7lbs.) and the manure sown with it ( $\frac{1}{2}$ cwt. bonedust). It is assumed that the costs of preparing the land in Winter and early Spring for sorghum seeding and of the intercultivation of this crop in Summer, are equivalent to those incurred in the breaking up and Summer working of the fallow.

TABLE XLIII.—Comparing Gross and Net Returns from Wheat and Wheaten Hay Crops Grown under Fallow-Wheat and Sorghum-Wheat Rotations, 1906-1922.

|                                                                   | Fallow-Wheat. |         | Sorghum-Wheat. |         |
|-------------------------------------------------------------------|---------------|---------|----------------|---------|
|                                                                   | Hay.          | Grain.  | Hay.           | Grain.  |
| Receipts—                                                         | £ s. d.       | £ s. d. | £ s. d.        | £ s. d. |
| Crop .....                                                        | 4 15 8        | 4 0 10  | 4 5 10         | 3 7 3   |
| Grazing .....                                                     | 0 12 2        | 0 12 2  | 0 17 11        | 0 17 11 |
| Total receipts per acre for two years                             | 5 7 10        | 4 13 0  | 5 2 9          | 4 5 2   |
| Expenditure—                                                      |               |         |                |         |
| Rent at 10s. per acre per annum ..                                | 1 0 0         | 1 0 0   | 1 0 0          | 1 0 0   |
| Cost of production .....                                          | 2 10 0        | 2 10 0  | 2 18 0         | 2 18 0  |
| Total expenditure per acre for two years .....                    | 3 10 0        | 3 10 0  | 3 18 0         | 3 18 0  |
| Balance of receipts over expenditure per acre for two years ..... | 1 17 10       | 1 3 0   | 1 4 9          | 0 7 2   |
| Balance of receipts over expenditure per acre per annum .....     | 0 18 11       | 0 11 6  | 0 12 5         | 0 3 7   |

Thus the practice of allowing a sorghum crop, instead of a bare fallow, to precede wheat, results in a relative loss of 6s. 6d. per acre per annum in the case of hay returns and 7s. 11d. per acre per annum in net grain returns. It is to be expected that the loss in grain returns is proportionately greater than that in hay yields: another effect, no doubt, of the depletion of moisture reserves in the soil which might be expected to have a more marked effect upon the ability of a crop to fill the grain than upon straw growth.



In the earlier reports on this test, a definite falling-off in the quality of wheat grown after sorghum, as indicated by bushel weight, was recorded. At present, however, this effect is not indicated by the mean of the recorded figures; the average bushel weight of the wheat from the Sorghum-Wheat plots is identical with that of the wheat from the Fallow-Wheat plots, namely, 62lbs. (*vide* Table XL.).

In 1913 a subdivision of the Sorghum-Wheat plots was made in order to test, on half of each plot, the effect of dressing the land with 14 tons of farmyard manure before seeding each sorghum crop. The figures recorded in Tables XLII. and XLIII., as representing returns in the Sorghum-Wheat rotation, were, therefore, obtained from plots of about 1 acre only for the period 1914-1922. These figures are shown again in the next Table, along with results recorded in the half-plots receiving the farmyard manure as well as the mineral manures used in the original rotation.

TABLE XLIV.—*Showing Comparative Results from Two Sorghum-Wheat Rotations, in One of which Farmyard Manure at the Rate of 14 Tons per Acre was Applied to the Sorghum, 1914-1922.*

| Year.                  | Sorghum-Wheat with Farmyard Manure. |         |                         |         | Sorghum-Wheat with Mineral Manures only. |         |                         |         |
|------------------------|-------------------------------------|---------|-------------------------|---------|------------------------------------------|---------|-------------------------|---------|
|                        | Grain per Acre.                     |         | Total Produce per Acre. |         | Grain per Acre.                          |         | Total Produce per Acre. |         |
|                        | B.                                  | L.      | T.                      | C.      | B.                                       | L.      | T.                      | C.      |
| 1914 .....             | 0                                   | 0       | 0                       | 0       | 0                                        | 0       | 0                       | 0       |
| 1915 .....             | 19                                  | 35      | 2                       | 4       | 20                                       | 35      | 2                       | 0       |
| 1916 .....             | 23                                  | 0       | 2                       | 7       | 24                                       | 50      | 2                       | 3       |
| 1917 .....             | 18                                  | 8       | 2                       | 1       | 12                                       | 41      | 1                       | 14      |
| 1918 .....             | 4                                   | 49      | 0                       | 10      | 4                                        | 13      | 0                       | 11      |
| 1919 .....             | 6                                   | 33      | 0                       | 16      | 10                                       | 24      | 0                       | 16      |
| 1920 .....             | 18                                  | 5       | 1                       | 11      | 20                                       | 44      | 1                       | 14      |
| 1921 .....             | 12                                  | 39      | 1                       | 4       | 11                                       | 0       | 1                       | 0       |
| 1922 .....             | 16                                  | 32      | 1                       | 13      | 14                                       | 50      | 1                       | 6       |
| Means for 9 seasons .. | 13                                  | 16      | 1                       | 7       | 14                                       | 22      | 1                       | 5       |
| Hay equivalent .....   | —                                   | —       | 1                       | 13      | —                                        | —       | 1                       | 10      |
| Values .....           | £ s. d.                             | £ s. d. | £ s. d.                 | £ s. d. | £ s. d.                                  | £ s. d. | £ s. d.                 | £ s. d. |
|                        | 2 19 8                              | 4 4 6   | 1 1 3                   | 3 4 8   | 3 17 1                                   | 0 18 9  |                         |         |

The addition of farmyard manure has thus had the effect of reducing the value of the wheat yield (by 5s. per acre), but has increased the hay and grazing returns by amounts, expressed in money values, of 7s. 5d. and 2s. 6d. respectively, making a total increase of 4s. 11d. per acre in favor of farmyard manure plots. The cost of application of this manure, however, as is usually the case, quite overshadows the value of any immediate returns which it might produce, and the net result is that the rotation in which mineral manures only are used shows an annual profit of 8s. 11d. per acre for the whole area (taking the hay return figures), and that in which farmyard manure is used shows an annual loss of £1 1s. 2d. per acre. The corresponding figures for grain returns are 2s. 9d. per acre per annum profit and £1 13s. 7d. loss.

(c) *Fallow-Wheat-Pasture*.—This rotation, which may be regarded as a standard one in South Australian farming practice, has been in force since 1905, but fencing was not completed until 1906, so that recorded grazing results for the first season are not available. The series was closed, along with others, in 1922, and there are thus the results of 17 seasons' work to be recorded.

In the "grazing" year in this rotation a light seeding of rape (4lbs. per acre) was applied to each wheat stubble, following a shallow working, in order to ensure an abundance of succulent feed in the event of satisfactory Autumn rains occurring. The cost of this seeding is computed at 5s. per acre. A corresponding addition to the normal working expenses is made in the calculations below. The wheat received 1cwt. superphosphate per acre, so that results are comparable with those of the Fallow-Wheat rotation already recorded.



In the next Table are shown the details of crop returns and total grazing provided by the whole area each year since 1915, together with mean results and values.

TABLE XLV.—*Showing Crop Returns and Total Grazing Provided by Land coming under Wheat Once in Three Years and Dressed Regularly with 1cwt. Superphosphate, 1906-1922.*

| Year.                   | Total Produce per Acre. |    |     | Grain per Acre. |    | Total Grazing as Sheep per Acre for a Year. |
|-------------------------|-------------------------|----|-----|-----------------|----|---------------------------------------------|
|                         | T.                      | C. | L.  | B.              | L. |                                             |
| 1916 .....              | 2                       | 5  | 102 | 26              | 56 | 3.17                                        |
| 1917 .....              | 2                       | 2  | 10  | 22              | 32 | 2.86                                        |
| 1918 .....              | 0                       | 17 | 90  | 11              | 12 | 2.14                                        |
| 1919 .....              | 0                       | 15 | 0   | 10              | 44 | 1.62                                        |
| 1920 .....              | 1                       | 9  | 52  | 19              | 3  | 3.09                                        |
| 1921 .....              | 1                       | 4  | 31  | 11              | 49 | 3.35                                        |
| 1922 .....              | 1                       | 10 | 56  | 16              | 59 | 2.98                                        |
| Means for 17 seasons .. | 1                       | 12 | 44  | 17              | 47 | 2.92                                        |
| Hay equivalent .....    | 1                       | 19 | 52  | —               | —  | —                                           |
|                         | £                       | s. | d.  | £               | s. | d.                                          |
| Values .....            | 4                       | 18 | 8   | 4               | 0  | 0                                           |
|                         |                         |    |     |                 |    | 1 16 5                                      |

Deducting from the crop values the costs of working (£2 10s., plus 5s.), and adding the remainder to the grazing value, we get £4 0s. 1d. and £3 1s. 5d. per acre as the total net returns for three years from hay and grain returns respectively. Three years' rent (30s.) is to be deducted from each of these totals, and the remainder divided by 3 gives the net return per acre per annum for the whole area covered by the rotation. This figure for hay returns is 16s. 8d. and for grain 10s. 6d. Comparing these with the corresponding figures for the Fallow-Wheat rotation (Table XLIII., 18s. 11d. and 11s. 6d. respectively), it is seen that there is a difference of 2s. 3d. per acre per annum in the case of hay returns and 1s. per acre per annum in that of grain yield. From the results of this test, then, it appears that the introduction of a year of pasture into the fallow-wheat rotation involves a small loss in net returns per acre. This loss is, however, in practice amply offset by the advantages of diversification of farming which the extra pasture area allows and by the enrichment of the soil which naturally results from the depasturing of livestock upon it. It is to be noted that, of the mean total grazing indicated by the figure 2.92 in the above Table, 1.74, or approximately two-thirds of the total, is provided in the pasture year of the rotation.

(d) *Fallow-Wheat-Barley*.—This test represents an attempt to secure a greater direct monetary return from cropping than is to be expected from either of the rotations already considered. The plots on which it was carried out from 1911 to 1922 are Nos. 38, 39, and 40. These are situated some 15 chains from the nearest of those dealt with in the foregoing paragraphs of this section, viz., the Fallow-Wheat-Pasture group. They were not fenced and hence detailed grazing figures are not available; moreover, in this series both the wheat and the barley received 2cwt. superphosphate per acre at each seeding, and the results are therefore not comparable with those of the Fallow-Wheat-Pasture series referred to above. There was, however, adjoining the latter series another which was treated similarly, except that the wheat received 2cwt. superphosphate per acre at each seeding. The results from this series have, therefore, been compiled as a basis of comparison for the Fallow-Wheat-Barley rotation. In order to arrive at an estimate of the grazing returns from this series the following figures have been taken: for the fallow grazing, the usual .25 sheep per acre; for the grazing on the wheat stubble, the same figure as is recorded in the control series, Fallow-Wheat-Pasture; for the grazing on the barley stubble, the same figure as for the wheat stubble (which is in all probability an under-estimate); and for the



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Autumn grazing prior to fallowing, again the same figure as in the other series. This amounts to a substitution of a stubble grazing in the one for the full year's pasture in the other series, and provides a grazing figure for the Fallow-Wheat-Barley rotation which is lower than that of the control series, and although an estimate only, is probably well on the safe side.

A summary of the results from the two series of plots is set out in the next Table.

TABLE XLVI.—*Showing Comparative Crop and Grazing Returns from the Two Rotations Fallow-Wheat-Pasture and Fallow-Wheat-Barley, 1911-1922.*

| Year.                | Fallow-Wheat-Pasture.   |          |               |           |                                        | Wheat.<br>Grain<br>per Acre.<br>Bush. lbs. | Fallow-Wheat-Barley. |                         |                         |    |    | Total<br>Grazing<br>Sheep<br>per Acre. |    |      |    |
|----------------------|-------------------------|----------|---------------|-----------|----------------------------------------|--------------------------------------------|----------------------|-------------------------|-------------------------|----|----|----------------------------------------|----|------|----|
|                      | Wheat.                  |          | Wheat.        |           | Total<br>Grazing<br>Sheep<br>per Acre. |                                            | Wheat.               |                         | Barley.                 |    |    |                                        |    |      |    |
|                      | Grain                   |          | Total Produce |           |                                        |                                            | Grain                |                         | Total Produce           |    |    |                                        |    |      |    |
|                      | per Acre.<br>Bush. lbs. | T. C. L. | per Acre.     | per Acre. | per Acre.<br>Bush. lbs.                |                                            | T. C. L.             | per Acre.<br>Bush. lbs. | per Acre.<br>Bush. lbs. |    |    |                                        |    |      |    |
| 1911                 | 21                      | 47       | 2             | 1         | 73                                     | 2-83                                       | 24                   | 12                      | 1                       | 19 | 3  | 43                                     | 9  | 2-41 |    |
| 1912                 | 22                      | 10       | 1             | 13        | 5                                      | 2-80                                       | 22                   | 39                      | 1                       | 14 | 99 | 19                                     | 14 | 1-61 |    |
| 1913                 | 5                       | 29       | 0             | 11        | 24                                     | 1-14                                       | 7                    | 12                      | 0                       | 11 | 43 | 9                                      | 16 | 0-65 |    |
| 1914                 | 11                      | 11       | 0             | 15        | 110                                    | 2-13                                       | 8                    | 10                      | 0                       | 13 | 46 | 0                                      | 45 | 1-63 |    |
| 1915                 | 24                      | 55       | 2             | 5         | 44                                     | 8-61                                       | 26                   | 20                      | 2                       | 5  | 18 | 38                                     | 21 | 6-58 |    |
| 1916                 | 25                      | 6        | 2             | 4         | 4                                      | 3-23                                       | 33                   | 39                      | 2                       | 15 | 87 | 15                                     | 49 | 2-03 |    |
| 1917                 | 20                      | 9        | 2             | 3         | 58                                     | 3-24                                       | 27                   | 8                       | 2                       | 6  | 50 | 32                                     | 37 | 1-75 |    |
| 1918                 | 12                      | 17       | 0             | 18        | 65                                     | 2-14                                       | 14                   | 45                      | 1                       | 3  | 71 | 7                                      | 13 | 1-82 |    |
| 1919                 | 9                       | 43       | 0             | 13        | 65                                     | 1-74                                       | 13                   | 29                      | 0                       | 17 | 18 | 1                                      | 20 | 1-29 |    |
| 1920                 | 19                      | 25       | 1             | 6         | 101                                    | 3-28                                       | 15                   | 36                      | 1                       | 6  | 72 | 19                                     | 6  | 2-13 |    |
| 1921                 | 15                      | 3        | 1             | 8         | 88                                     | 3-82                                       | 17                   | 24                      | 1                       | 12 | 10 | 12                                     | 33 | 2-66 |    |
| 1922                 | 17                      | 34       | 1             | 10        | 68                                     | 3-38                                       | 21                   | 11                      | 1                       | 13 | 98 | 26                                     | 38 | 1-99 |    |
| Means for 12 seasons | 17                      | 4        | 1             | 9         | 49                                     | 3-20                                       | 19                   | 19                      | 1                       | 11 | 70 | 18                                     | 46 | 2-21 |    |
| Hay equivalent.....  | —                       |          | 1             | 15        | 101                                    | —                                          | —                    |                         | 1                       | 18 | 64 | —                                      |    | —    |    |
| Values               | £                       | s.       | d.            | £         | s.                                     | d.                                         | £                    | s.                      | d.                      | £  | s. | d.                                     | £  | s.   | d. |
|                      | 3                       | 16       | 10            | 4         | 9                                      | 9                                          | 2                    | 0                       | 0                       | 4  | 6  | 11                                     | 4  | 16   | 5  |
|                      |                         |          |               |           |                                        |                                            |                      |                         |                         |    |    |                                        |    |      |    |
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|                      |                         |          |               |           |                                        |                                            |                      |                         |                         |    |    |                                        |    |      |    |
|                      |                         |          |               |           |                                        |                                            |                      |                         |                         |    |    |                                        |    |      |    |

It will be seen that the rotation including barley shows a loss in grazing value of approximately one sheep per acre for a year and this is offset by the whole value of the barley crop. The wheat returns in this rotation are better by 2½ bush. of grain, or almost 3 cwt. of hay, per acre, but this cannot be claimed as a result of any beneficial effect exerted by the barley. The difference is probably due to experimental error arising from the relatively wide separation of the groups of plots. In any case, however, the increase in net returns, which are shown below to be apparently due to the introduction of the barley into this three-course rotation, is far greater than could be accounted for by this extra yield of wheat.

In arriving at the respective net results in these tests the same deductions as before have been made for costs, viz., £2 10s. per acre for normal wheat production, 10s. per acre per annum for rent, 5s. per acre for rape seeding in the pasture year, £1 15s. per acre for the normal cost of barley growing. In addition, 4s. 6d. per acre has been added to the cost of each seeding to represent the cost of extra superphosphate as compared with the 1 cwt. provided for in normal costs. After making a calculation similar to that shown in Table XLIII., the following net returns are shown:—For the Fallow-Wheat-Pasture rotation 13s. 5d. and 9s. 1d. per acre per annum when the wheat crop is disposed of as hay and grain respectively; and for the Fallow-Wheat-Barley rotation the corresponding figures are 18s. 11d. and 15s. 9d.

It would appear, then, that the introduction of barley has been responsible for a substantial increase in net annual returns; an increase of about 6s. per acre per annum.

It is to be noted that the period covered by this test includes a bigger proportion of lean years than occurred in the periods of other rotational experiments already dealt with and mean crop returns are correspondingly lower. Nevertheless, the figures representing net annual returns per acre for the Fallow-Wheat-Barley rotation (18s. 11d. and 15s. 9d.) compare favorably with the corresponding figures for the Fallow-Wheat rotation (18s. 11d. and 11s. 6d.), and the association of barley with wheat in this way may be said to show better returns than either of the other systems of farming dealt with so far.

(To be continued.)



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## THE IDENTIFICATION OF *PHALARIS TUBEROSA* (syn. *BULBOSA*) AND *PHALARIS MINOR* IN SEED SAMPLES AND IN THE FIELD.

[By H. C. TRUMBIE, M. Agr. Sc., Waite Agricultural Research Institute,  
University of Adelaide.]

### IMPORTANCE OF PHALARIS GRASSES TO SOUTH AUSTRALIA.

Investigations at the Waite Institute have indicated that *Phalaris tuberosa* (Toowoomba Canary Grass) is a promising pasture grass for climatic conditions resembling those of Adelaide, and for the more favored areas of the State. It is distinguished from other species of *Phalaris* by its perennial nature, underground rootstock, bulbous bases to the mature tillers, and a long, tapering seed-head. A free-tillering, semi-subterranean habit enables it to withstand close grazing, and if stocked heavily the grass forms a close turf.

For many years this species has been known as *Phalaris bulbosa* L. Allan and Zotov, however, have recently presented evidence<sup>1</sup> to show that the correct name of the grass is *Phalaris tuberosa* L., and that grasses in different parts of the world known respectively as *P. nodosa*, *P. stenoptera*, and *P. bulbosa* are actually *P. tuberosa*. Bews<sup>2</sup> in his "World's Grasses" uses the name *Phalaris tuberosa* (syn. *bulbosa*). The name *P. commutata* has also been frequently used in Australia, but quite erroneously, there being no grass of this name. It is evident, as Allan and Zotov say, that<sup>3</sup> to avoid further confusion the names "*commutata*," "*bulbosa*," "*stenoptera*," and "*nodosa*" should be dropped altogether, and, pending further investigation of the group, the name *Phalaris tuberosa* be used exclusively for the perennial bulbous grass commonly known as Toowoomba Canary Grass.

The particular reasons for the value of this grass over much of the winter rainfall zone of Australia are firstly its drought-resistance, and secondly its ability to produce feed rapidly with the first seasonal rains. The grass is normally dormant during summer, but produces feed after thunderstorms. The perennial root system with long, fibrous rootlets is protected by a tough, woolly covering and has been traced through subsoil clay at the Waite Institute to a depth of 42in.

*Phalaris tuberosa* has been grown in South Australia since 1906, when Mr. A. Canning, of Murraytown, exhibited a sheaf of the grass at the Adelaide Royal Agricultural Show. Records are available of its having since been grown successfully at Geranium, Jamestown, Georgetown, Saddleworth, Kingscote, Port Elliot, Naracoorte, Mount Remarkable, Willunga, Williamstown, Gumeracha, and Meadows on annual rainfalls varying from 17in. to 36in. Except at Williamstown, however, where more than 100 acres have been established, the grass has been sown only on a small scale. Nevertheless, at most of the centres above mentioned, it is still to be found persisting, more than 20 years after the original sowings.

*Phalaris minor* is an annual with no underground rootstock nor bulbous bases to the tillers, but it resembles *Phalaris tuberosa* in leaf characters, and to a considerable degree in panicle and seed characters as well. Like Wimmera Rye Grass and the cereals, it produces little feed until some weeks after the seeds have germinated in autumn or winter; in addition the mature plants will not respond to rain after the seed has ripened

1. New Zealand Journ. of Agric., XL., No. 4 (April, 1930), pp. 256-264.

2. "The World's Grasses," J. W. Bews, 1929.



in early summer. *Phalaris minor* is comparable in vigor under Adelaide conditions to Wimmera Rye Grass, but is a temporary element only, and distinctly inferior as a pasture plant to the perennial *Phalaris tuberosa*. The annual species could, however, be used as an alternative to Wimmera Rye Grass in this State.

The two other *Phalaris* grasses naturally occurring in South Australia, namely, *Phalaris canariensis* and *Phalaris paradoxa*, are found but rarely in pastures. *Phalaris canariensis* was grown in earlier years as a grain crop for bird seed.

#### PRESENCE OF PHALARIS MINOR SEED IN PHALARIS TUBEROSA SAMPLES.

As early as 1909, Mr. G. T. Griggs, of Meadows,<sup>3</sup> reported that he had obtained success with *Phalaris tuberosa* by root planting, but that on purchasing seed had found that the resulting plants were all *Phalaris minor*. This has also been the experience of others, and is probably one reason why the grass has not increased in popularity in South Australia. Allan and Zotov<sup>4</sup> note that *Phalaris minor* has occasionally been grown as a crop and the seed sold under the misapprehension that it was Toowoomba Canary Grass, in both New Zealand and Australia, and quote Kennedy,<sup>5</sup> who, in 1917, stated:—"That much, if not all, of the seed of *Phalaris* now on the markets of New Zealand and Australia is hopelessly mixed seems to be certain."

At the Waite Institute difficulty has been experienced in obtaining pure *Phalaris tuberosa* seed for experimental purposes, and this, in addition to the unsatisfactory nature of the general position, has led to a study of the "seed" and seedling characters of the two species, with a view to obtaining a ready and constant means of identification.

During the last 15 months, 43 samples of seed labelled as *Phalaris bulbosa* have been received from leading seedsmen in Australia and from private individuals interested in the grass. In addition, more than a hundred samples of *Phalaris tuberosa* have been collected by the writer from plants growing naturally in different parts of the State. Of the 43 samples first mentioned, 29 were found to be pure *Phalaris tuberosa*, 10 to be pure *Phalaris minor*, three to be mixtures of the two species, and one a different species. Of 20 samples obtained from seed merchants, only 12 were pure *Phalaris tuberosa*, four were pure *Phalaris minor*, three were mixtures of the two species, and one was actually an unrelated grass, *Poa bulbosa*.

#### BOTANICAL FEATURES OF PHALARIS TUBEROSA AND PHALARIS MINOR "SEEDS."\*

The botanical features of *Phalaris tuberosa* and *Phalaris minor* have recently been described by Allan and Zotov<sup>6</sup>, who also give an account of the origin of *Phalaris tuberosa* in Australia<sup>7</sup>. Whereas the descriptions given in the case of these species apply to samples typical of each species, an examination of the material collected by the Waite Institute has shown that there is a whole series of "seed" types ranging from typical *Phalaris tuberosa* down to typical *Phalaris minor*, with intermediate types occurring in both species. Although typical "seeds" of each grass differ fairly definitely in shape, color, pubescence, and nature of the glume appendages, the "seed" characters of the two species, and of *Phalaris tuberosa* in particular, vary so greatly that in some cases it is impossible to identify the species with certainty from the "seed" alone.

3. S. Aus. Journ. of Agric. (Sept., 1909).

4. Loc. cit.

5. Univ. California Publns. in Agric. Science. Vol. 3, No. 1 (July, 1917), pp. 1-24.

6. Loc. cit.

7. Vide also A. J. Ewart, Jr. Vic. Dept. Agr., Dec., 1908, p. 738; and J. M. Black, S.A. J. Agr., Jan., 1909, p. 546.

\* The "seed" characters described are, of course, those of the fertile glumes, or husks, surrounding the actual grain.



The main "seed" characters as described by Allan and Zotov are listed below. The most constant and characteristic features as borne out by South Australian collections are presented in heavier type.

|                                    | <i>Phalaris tuberosa.</i>                                | <i>Phalaris minor.</i>                                   |
|------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| 1. COLOR .....                     | Pale to dark-brown shining                               | Dark brownish grey                                       |
| 2. VENATION .....                  | Finely striate with 5 distinct nerves                    | Indistinct                                               |
| 3. PUBESCENCE .....                | Sparse or rather dense, especially in upper two-thirds   | Dense save for distinct bald patch in lower third        |
| 4. SHAPE .....                     | Narrow, ovate, lanceolate, gradually tapering to a point | Broadly ovate, lanceolate, abruptly narrowing to a point |
| 5. LENGTH .....                    | 3.25 mm.                                                 | 2.75 mm.                                                 |
| 6. BREADTH .....                   | 1.25 mm.                                                 | 1.25 mm.                                                 |
| 7. APPENDAGE TO 1ST STERILE FLORET | Minute up to 0.75 mm. long                               | Absent                                                   |
| 8. APPENDAGE TO 2ND STERILE FLORET | Up to 1.75 mm. long                                      | Up to 1 mm. long, rather more hairy                      |

In addition, the "seeds" of *Phalaris minor* tend to be rather more compressed, giving them a slightly flatter appearance than those of the perennial species.

#### UNRELIABILITY OF "SEED" CHARACTERS.

Color appears to be the least constant of the above characters so far as Australian samples are concerned, and is largely dependent on stage of maturity. It is also probably affected to some extent by the environmental conditions obtaining during the ripening period.

In most other characters, *Phalaris minor* "seeds" usually conform closely to the descriptions given above for this species, and may readily be identified. The occurrence of some samples, however, with pale "seeds," not highly pubescent, and tapering quite as gradually as some forms of *Phalaris tuberosa*, renders the identification of *Phalaris minor* not a positive one. Furthermore, *Phalaris tuberosa* is variable in most of the characters described. In some samples the veins are indistinct as in *Phalaris minor*; the shape, and degree of pubescence are particularly variable, whereas the appendage to the first sterile floret is sometimes considerably reduced, and may be altogether absent, particularly in the case of "seeds" from machine-dressed samples. The result of the realisation that the "seed" types of each species definitely overlap is that one is reluctant to pronounce a verdict on a supposedly *Phalaris tuberosa* sample from the evidence of "seed" characters alone.

The absence of the appendage to the first sterile floret in certain "seeds" from plants that otherwise conform to *P. tuberosa* corroborates the specimens sent to Professor Hackel, in 1908<sup>8</sup>, and tends to contradict the theory put forward by Kennedy that these were composed of the vegetative portions of *P. tuberosa* and "seeds" of *P. minor*.

Fig. 1 indicates the variability found in each species. The top row of seven "seeds" depicts seven distinct types of *Phalaris tuberosa* taken from samples which produced perennial plants only, whereas the bottom row is composed of "seeds" from samples which produced only *Phalaris minor*. In the case of each species the most typical specimens are to the left, and the least typical on the right.

8. Allan and Zotov; *loc. cit.*



The details as to the origin of the seeds in Fig. 1 are as follows:—

*Phalaris tuberosa* (top row). Nos. 1, 4, and 7 from *Phalaris tuberosa* plants growing at the Waite Institute. Nos. 2, 3, 5, and 6 from commercial samples which produced *Phalaris tuberosa* plants only.

*Phalaris minor* (bottom row). Nos. 1, 4, and 7 from *Phalaris minor* plants growing at the Waite Institute. Nos. 2, 3, 5, and 6 from commercial samples sold as *Phalaris bulbosa*, but producing *Phalaris minor* plants.



Fig. 1.—“Seeds” of *Phalaris tuberosa* (top) and *Phalaris minor* (bottom).

#### CHARACTERS OF GERMINATING SEEDS.

The unreliability of “seed” characters being thus apparent, germinating seeds and young seedlings were studied, with the result that a simple and readily determinable difference was found in the germinating roots of the two species.

In the case of *Phalaris minor* the tip of the radicle or young root is colored a bright pink (Fig. 2), whereas in *Phalaris tuberosa* it is colorless or slightly yellowish. By placing the seeds on moist filter paper at 20° C. the character may be obtained within four days. Of 45 samples of pure *Phalaris tuberosa* tested in this way, no pink tips have been found. This applies also to *P. arundinacea*, *P. canariensis*, *P. angusta*, *P. brachystachys*, *P. caroliniana*, *P. coerulescens*, *P. lemmonii*, and to *P. stenophylla*, which, although perennial and said to be superior in N.S.W. to *P. tuberosa*, has seeds resembling *P. minor* in shape. Of 10 *Phalaris minor* samples tested, all seeds showed the pink-tipped character. One commercial sample which produced pure stands of *Phalaris minor* in the field, showed some white-tipped radicles among a majority of pink tips, and for a time caused doubt to be thrown on the constancy of the difference. The resulting seedlings have since been shown, however, to be of two kinds, typical respectively of the two species, and it has been assumed that in the heavy rate of seeding adopted, the perennial plants were eliminated as a result of competition from the more rapidly growing annual, which ultimately obtained complete possession of the plot. This sample is being further investigated.

Pink radicle tips have been found in European, American, and New Zealand samples, as well as those of Australian origin. On the basis of data so far available it would seem that some indication of the presence or absence of *Phalaris minor* may be obtained from the appearance of the seeds as described by Allan and Zotov, and emphasised in this paper. The occurrence of pink-tipped radicles in the germinating seeds of the sample appears, however, to be a more reliable guide, particularly in border line cases, and samples in which pink-tipped radicles occur in quantity on germination should



certainly not be sown where a *Phalaris tuberosa* sward is desired. The pink-tip character also enables the percentage of viable seeds of each species in a sample to be determined with accuracy. The coloration in the case of *Phalaris minor* appears to persist, and has been noted on the roots of plants several months after germination.

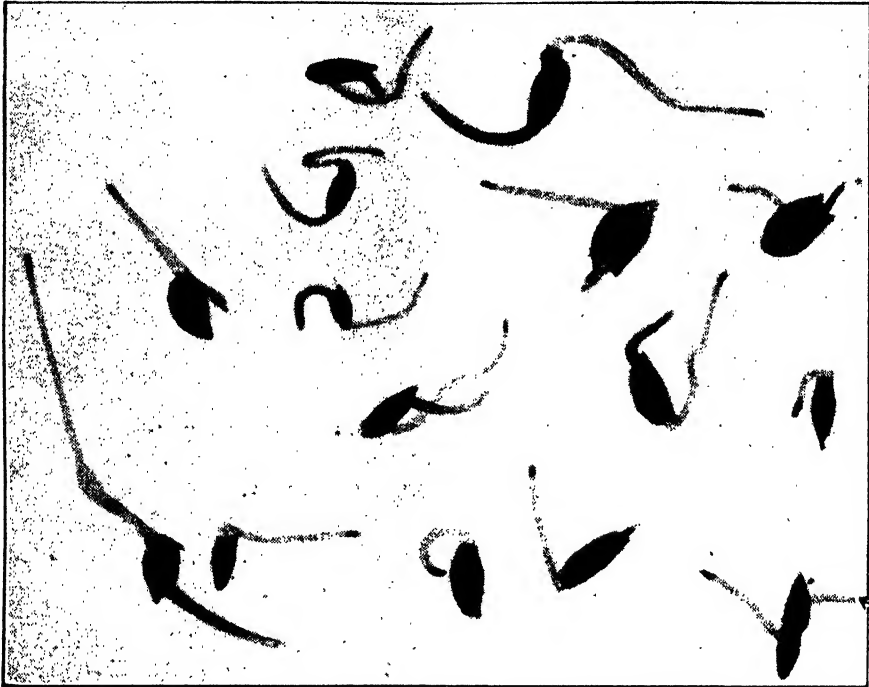


Fig. 2.—Germinating Seeds of *Phalaris minor*.

#### SEEDLING, VEGETATIVE, AND MATURE PLANT CHARACTERS.

The seedlings of the two species show little difference. *Phalaris minor* tends to be rather more vigorous in growth from seed and more papery in texture. The germination of both species is active. The leaves of *Phalaris tuberosa* tend to become slightly stiffer and more fibrous than those of the annual species. Microscopic sections of young leaves indicate that there is little difference in vascular structure. *Phalaris tuberosa* tends to produce fibre at rather an earlier stage and to produce epidermal hair cells in more abundance, but the differences are not sufficiently great to be made use of. As active tillering commences, differences become pronounced, and it is possible to identify the species with certainty. The tillers of *Phalaris tuberosa* arise from below the soil surface, growing at a low angle for some distance through the soil before becoming visible. On emergence the tillers assume a stiff appearance, and the crown of the plant is seen to be subterranean. On the other hand, the tillers of *Phalaris minor* arise from above soil level and assume a more succulent, drooping appearance. The young tillers of either species, on being cut near the base, exude sap of a reddish color, and this is a positive test for those species of the genus found growing in South Australia.

*Phalaris minor* is considerably earlier than the perennial species, the dates of flowering and maturity at Adelaide in 1929 being as follows:—

|                                  | Flowering. | Maturity.   |
|----------------------------------|------------|-------------|
| <i>Phalaris minor</i> .. .. .    | October 4  | November 6  |
| <i>Phalaris tuberosa</i> .. .. . | November 8 | December 18 |



The panicle of *Phalaris minor* is cylindrical in shape and about four times as long as it is broad. The panicle of *Phalaris tuberosa* is typically tapering and about six to eight times as long as it is broad. The shape and length of the panicle varie considerably in *Phalaris tuberosa*, however, specimens having been found with panicle



Fig. 3.—Seedlings of *Phalaris tuberosa* (left) and *Phalaris minor* (right).

similar to those of a typical *Phalaris minor* head. A character of the mature seed head which has so far proved reliable is the nature of the wing to the outer sterile glumes, as described by Allan and Zotov<sup>10</sup>; abruptly pointed in *Phalaris tuberosa*, and incurving sharply pointed in *Phalaris minor*.

10. *Loc. cit.*



PRESENT RESTRICTIONS TO THE USE OF *PHALARIS TUBEROSA* IN SOUTH AUSTRALIA.

The unreliability of commercial samples of *Phalaris tuberosa* has been a serious drawback in the past, and it is hoped that the data here presented will be of value in overcoming this difficulty. It is encouraging to learn that seeds merchants are anxious to eliminate *Phalaris minor* from their samples.

The present high price of the seed, which is approximately 6s. per lb., considerably restricts the use of the grass by farmers, and is probably governed by the demand and by the low yields of seed normally obtained per acre.

Selection is being employed at the Waite Institute as a means of isolating productive and persistent strains of superior seed-yielding ability. The preliminary work so far accomplished indicates considerable variability within the species and ample scope for improvement by this means.

## STATE OF SOUTH AUSTRALIA

## ACREAGE OF CROPS, SEASON 1930-31.

The Government Statist reports having completed an estimate of the probable acreage, either sown or intended to be sown with cereals, for the season 1930-31. This estimate is based on returns received some time ago from farmers in each agricultural hundred of the State. It should be understood that the estimate represents the areas farmers anticipated sowing. The serious lack of early seasonal rains would have prevented many farmers actually sowing to the extent anticipated, and in some districts resowing will be necessary. It is thought, however, that the bountiful general rains of early July may now so expedite sowing that the estimate based on early reports may prove to be reasonably accurate.

Following the usual practice, further reports will be obtained after all sowing is completed, when the whole of the figures will be reviewed for a more confident estimate to be issued in September.

*Estimated Wheat Acreage.*

| Division.           | Actual,<br>1930. | Estimated,<br>1930-31. | Increase. |
|---------------------|------------------|------------------------|-----------|
|                     | Acres.           | Acres.                 | Acres.    |
| Central .....       | 639,010          | 691,000                | 51,990    |
| Lower North .....   | 894,623          | 918,000                | 23,377    |
| Upper North .....   | 281,523          | 326,000                | 44,477    |
| South-Eastern ..... | 50,356           | 68,000                 | 17,644    |
| Western .....       | 1,088,053        | 1,273,000              | 184,947   |
| Murray Mallee ..... | 1,033,745        | 1,168,000              | 134,255   |
| Total State .....   | 3,987,310        | 4,444,000              | 456,690   |

*Barley.*—Actual, 1929-30, 320,123 acres; estimated, 1930-31, 280,000 acres.

*Oats.*—Actual, 1929-30, 520,428 acres; estimated, 1930-31, 512,000 acres.

*Expansion of Last Five Seasons.*—The total area sown for all purposes with wheat, barley, and oats has increased from 3,410,213 acres in 1925-26 to 4,827,861 acres for 1929-30—a four years' increase of 1,417,648 acres, with a further increase of 408,000 acres if the estimated intended sowing of 5,236,000 acres for 1930-31 is realised.

*Prospects.*—Notwithstanding the serious shortage of rain to the end of June, statistics indicate that, with the bountiful general rains of this month, followed up by good spring rains to November, the State may yet reap a reasonable harvest.

*Five Year's Clearing of New Land.*—During the last five years 886,381 acres have been cleared in the Western Division, 225,782 during 1929-30, and 725,301 acres in the Murray Mallee Division, 138,233 acres during 1929-30. The total for the whole State is 1,726,258, and 392,168 acres for year 1929-30.



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## BOOBOROWIE EXPERIMENTAL FARM HARVEST REPORT, 1929-1930.

[By R. C. SCOTT, Supervisor of Experimental Work, and E. A. BRISTOW, Manager.]

The Booborowie Farm is situated about 120 miles north of Adelaide, and 12 miles west of Hallett. The total area is 1,484 acres, of which 1,186 acres surrounds the old North Booborowie Station homestead, and the remainder, 298 acres, is situated some two miles distant in an easterly direction. The country may be divided into three classes, namely, that suitable for lucerne growing, without irrigation; that suited for cereals; and that which is not arable but provides really good natural pasture. This report deals with the results from the cereal crops in 1929-1930.

### THE SEASON.

Season 1929 must go down in our records as one of the most unfavorable experienced at Booborowie. The opening rains were light and distributed over a number of falls, with the result that the seed was sown in comparatively dry soil. However, a good germination resulted, and notwithstanding a winter rainfall below the average, crops made good headway until the end of September. From October 8th to November 17th only a few points were recorded, and crops were forced to maturity under most adverse conditions. Not only were the yields disappointing, but the quality of the grain also suffered.

In the following table the rainfall, month by month, comparatively with that for previous years and the average since 1900 is shown.

*Monthly Rainfall at Booborowie, 1900-29.*

| Month.       | 1925. | 1926. | 1927. | 1928. | 1929. | Means.          |
|--------------|-------|-------|-------|-------|-------|-----------------|
|              | In.   | In.   | In.   | In.   | In.   | 1900-29.<br>In. |
| January ...  | 0.72  | 0.00  | 0.27  | 1.15  | 0.33  | 0.55            |
| February ..  | 2.60  | 0.41  | 0.50  | 1.96  | 0.32  | 0.71            |
| March.....   | 0.00  | 0.68  | 0.74  | 0.91  | 0.13  | 0.71            |
| April.....   | 0.76  | 0.74  | 0.21  | 0.81  | 0.09  | 0.91            |
| May .....    | 2.06  | 4.67  | 1.26  | 1.88  | 1.30  | 1.89            |
| June .....   | 1.04  | 1.31  | 1.15  | 3.59  | 1.79  | 2.46            |
| July .....   | 2.57  | 1.27  | 3.39  | 2.00  | 1.28  | 2.10            |
| August ....  | 0.88  | 3.27  | 2.15  | 0.58  | 1.30  | 2.12            |
| September .  | 3.24  | 2.55  | 1.37  | 2.28  | 2.55  | 2.25            |
| October .... | 1.18  | 2.65  | 0.12  | 1.62  | 0.51  | 1.68            |
| November .   | 1.31  | 0.24  | 0.71  | 0.00  | 0.79  | 1.01            |
| December ..  | 0.00  | 0.00  | 1.30  | 0.13  | 3.05  | 1.09            |
| Totals..     | 16.36 | 17.79 | 13.17 | 16.91 | 13.44 | 17.48           |

The total for the year is 13.44 inches, or 4.04 inches below the mean of 17.48 inches obtained for the period 1900-29.

September and December were the only months in which the fall exceeded the average, but that registered in the latter month was of no value to cereal crops. October and November were the critical months, the falls totalling 51 and 79 points respectively, whilst temperatures were high.



*Distribution of Useful Rainfall, 1900-1929.*

|                                 | 1925.<br>In. | 1926.<br>In. | 1927.<br>In. | 1928.<br>Ins. | 1929.<br>In. | Means,<br>1900-29.<br>In. |
|---------------------------------|--------------|--------------|--------------|---------------|--------------|---------------------------|
| Seeding Rains (April-May) ..... | 2.82         | 5.41         | 1.47         | 2.69          | 1.39         | 2.80                      |
| Winter Rains (June-July) .....  | 3.61         | 2.58         | 4.54         | 5.59          | 3.07         | 4.56                      |
| Spring Rains (Aug.-Oct.) .....  | 5.30         | 8.47         | 3.64         | 4.48          | 4.36         | 6.05                      |
| Early Summer Rains (Nov.) ..... | 1.31         | 0.24         | 0.71         | 0.00          | 0.79         | 1.01                      |
| Totals .....                    | 13.04        | 16.70        | 10.36        | 12.76         | 9.61         | 14.42                     |

From the above table it will be noted that the "Useful Rainfall" amounted to 9.61 inches. On only one other occasion have crops had to develop under such low rainfall, namely, in 1914, when the total "Useful" was 7.79 inches.

Not only was the rainfall scanty, but during July and August frosts were frequent and severe, all tending to retard plant growth.

**HAY CROPS.**

In all, 103 acres of cereal crops were cut for hay. This area was divided between nine fields, and made up of headlands and divisions cut between varieties.

The highest return was secured from Field No. 5, 1 ton 7cwts. 67lbs., and the general average amounted to 1 ton 1cwt. 17lbs.

The mean hay yield for the farm is 1 ton 19cwts. 55lbs. per acre.

*Table Showing Hay Returns, Booborowie, 1915-1929.*

| Year.       | Total<br>Rainfall.<br>In. | Useful<br>Rainfall.<br>In. | Area.<br>Acres. | Total Yield. |    |     | Acre Yield. |    |     |
|-------------|---------------------------|----------------------------|-----------------|--------------|----|-----|-------------|----|-----|
|             |                           |                            |                 | T.           | C. | L.  | T.          | C. | L.  |
| 1915 .....  | 17.14                     | 15.95                      | 52.27           | 144          | 15 | 0   | 2           | 15 | 43  |
| 1916 .....  | 22.41                     | 20.28                      | 37.93           | 109          | 14 | 0   | 2           | 17 | 94  |
| 1917 .....  | 26.70                     | 21.02                      | 58.43           | 198          | 19 | 0   | 3           | 8  | 11  |
| 1918 .....  | 13.87                     | 11.98                      | 51.41           | 107          | 0  | 0   | 2           | 1  | 70  |
| 1919 .....  | 18.39                     | 13.77                      | 75.75           | 117          | 0  | 0   | 1           | 10 | 100 |
| 1920 .....  | 22.22                     | 19.57                      | 75.64           | 225          | 0  | 0   | 2           | 19 | 55  |
| 1921 .....  | 20.50                     | 15.46                      | 47.41           | 98           | 0  | 0   | 2           | 1  | 38  |
| 1922 .....  | 20.32                     | 15.61                      | 88.38           | 168          | 0  | 0   | 1           | 18 | 2   |
| 1923 .....  | 21.17                     | 18.23                      | 76.07           | 215          | 0  | 0   | 2           | 16 | 74  |
| 1924 .....  | 24.58                     | 19.37                      | 76.79           | 170          | 0  | 0   | 2           | 4  | 31  |
| 1925 .....  | 16.36                     | 13.04                      | 60.50           | 87           | 4  | 58  | 1           | 8  | 75  |
| 1926 .....  | 17.79                     | 16.70                      | 91.00           | 151          | 10 | 70  | 1           | 13 | 34  |
| 1927 .....  | 13.17                     | 10.36                      | 109.00          | 117          | 5  | 50  | 1           | 1  | 58  |
| 1928 .....  | 16.91                     | 12.76                      | 60.52           | 82           | 19 | 109 | 1           | 7  | 48  |
| 1929 .....  | 13.44                     | 9.61                       | 103.05          | 109          | 0  | 0   | 1           | 1  | 17  |
| Means ..... | 19.00                     | 15.58                      | 1,064.15        | 2,101        | 8  | 63  | 1           | 19 | 55  |

**OAT CROPS.**

The oatens crops were sown on stubble land in the Rotation Plots. The season proved altogether unfavorable to oats, consequently crops developed poorly, and ultimately an average of 9bush. 16lbs. of grain was harvested. As a rule very good oat crops are secured in this district, and the farm average for the period 1915-1929 is 26bush. 34lbs.



*Oat Returns, Booborowie, 1915-1929.*

| Year.      | Total<br>Rainfall. | Useful<br>Rainfall. | Area.<br>Acres. | Total Yield. |    | Acre<br>Yield. |    |
|------------|--------------------|---------------------|-----------------|--------------|----|----------------|----|
|            | In.                | In.                 |                 | B.           | L. | B.             | L. |
| 1915 ..... | 17-14              | 15-95               | 75-47           | 2,410        | 20 | 31             | 38 |
| 1916 ..... | 22-41              | 20-28               | 4-23            | 138          | 33 | 32             | 33 |
| 1917 ..... | 26-70              | 21-02               | 4-68            | 231          | 25 | 49             | 20 |
| 1918 ..... | 13-87              | 11-98               | 31-93           | 863          | 27 | 27             | 2  |
| 1919 ..... | 18-39              | 13-77               | 22-40           | 451          | 18 | 20             | 6  |
| 1920 ..... | 22-22              | 19-57               | 19-24           | 843          | 20 | 43             | 34 |
| 1921 ..... | 20-50              | 15-46               | 18-72           | 445          | 19 | 23             | 32 |
| 1922 ..... | 20-32              | 15-61               | 22-89           | 579          | 6  | 25             | 12 |
| 1923 ..... | 21-17              | 18-23               | 24-30           | 655          | 4  | 26             | 38 |
| 1924 ..... | 24-58              | 19-37               | 34-03           | 931          | 19 | 27             | 15 |
| 1925 ..... | 16-36              | 13-04               | 31-50           | 774          | 11 | 24             | 58 |
| 1926 ..... | 17-79              | 16-70               | 43-34           | 669          | 24 | 15             | 18 |
| 1927 ..... | 13-17              | 10-36               | 3-17            | 52           | 28 | 16             | 25 |
| 1928 ..... | 16-91              | 12-76               | 3-17            | 113          | 13 | 35             | 30 |
| 1929 ..... | 13-44              | 9-61                | 3-17            | 29           | 33 | 9              | 16 |
| Means ...  | 19-00              | 15-58               | 342-24          | 9,188        | 20 | 26             | 34 |

## BARLEY CROPS.

Very poor growth characterised the barley crops, and from an area of 2.89 acres a return of 3bush. 33lbs. per acre was obtained. This is the lowest yield recorded in our averages, and is almost 21bush. below the mean return for the farm, namely, 25bush. 43lbs.

*Barley Returns, Booborowie, 1915-1929.*

| Year.      | Total<br>Rainfall. | Useful<br>Rainfall. | Area.<br>Acres. | Total Yield. |    | Acre<br>Yield. |    |
|------------|--------------------|---------------------|-----------------|--------------|----|----------------|----|
|            | In.                | In.                 |                 | B.           | L. | B.             | L. |
| 1915 ..... | 17-14              | 15-95               | 3-09            | 108          | 26 | 35             | 6  |
| 1916 ..... | 22-41              | 20-28               | 35-93           | 1,119        | 46 | 31             | 8  |
| 1917 ..... | 26-70              | 21-02               | 23-65           | 914          | 26 | 38             | 33 |
| 1918 ..... | 13-87              | 11-98               | 29-11           | 1,045        | 23 | 35             | 46 |
| 1919 ..... | 18-39              | 13-77               | 32-58           | 501          | 1  | 15             | 19 |
| 1920 ..... | 22-22              | 19-57               | 35-39           | 1,087        | 38 | 30             | 37 |
| 1921 ..... | 20-50              | 15-46               | 52-52           | 1,454        | 5  | 27             | 34 |
| 1922 ..... | 20-32              | 15-61               | 38-53           | 1,014        | 35 | 26             | 17 |
| 1923 ..... | 21-17              | 18-23               | 35-00           | 611          | 27 | 17             | 24 |
| 1924 ..... | 24-58              | 19-37               | 25-16           | 564          | 47 | 22             | 23 |
| 1925 ..... | 16-36              | 13-04               | 41-18           | 897          | 0  | 21             | 27 |
| 1926 ..... | 17-79              | 16-70               | 33-13           | 732          | 9  | 22             | 5  |
| 1927 ..... | 13-17              | 10-36               | 3-00            | 41           | 38 | 13             | 46 |
| 1928 ..... | 16-91              | 12-76               | 2-89            | 83           | 46 | 29             | 2  |
| 1929 ..... | 13-44              | 9-61                | 2-89            | 10           | 28 | 3              | 33 |
| Means ...  | 19-00              | 15-58               | 394-05          | 10,187       | 35 | 25             | 43 |

## WHEAT CROPS.

The wheat crops were seeded from the middle of May to the middle of June at the rate of 75lbs. of seed and 180lbs. 45 grade superphosphate per acre.

Notwithstanding the fact that the seeding period was unusually dry, a very satisfactory germination resulted. However, dry, hot, early summer weather settled all prospect of heavy yields, and not only were the returns low, but the quality of the grain was also poor.



A summary of the harvest is as follows:—

*Summary of Wheat Harvest.*

| Field.          | Variety.                      | Area.<br>Acres. | Total Yield<br>Bush. lbs. | Acres<br>Yield<br>Bush. lbs. |
|-----------------|-------------------------------|-----------------|---------------------------|------------------------------|
| No. 11 .....    | Ford .....                    | 4.83            | 80 38                     | 16 42                        |
| No. 12 .....    | Bena .....                    | 5.08            | 113 17                    | 22 18                        |
| No. 13 .....    | Sultan .....                  | 3.15            | 58 45                     | 18 39                        |
|                 | Dan .....                     | 9.49            | 163 10                    | 17 12                        |
|                 |                               | 12.64           | 221 5                     | 17 33                        |
| No. 25 .....    | Caliph .....                  | 8.72            | 133 19                    | 15 17                        |
|                 | Calibre .....                 | 11.46           | 173 28                    | 15 8                         |
|                 | Major .....                   | 11.86           | 159 9                     | 13 25                        |
|                 | Late Gluyas .....             | 5.50            | 69 29                     | 12 38                        |
|                 |                               | 37.54           | 535 25                    | 14 0                         |
| No. 27 .....    | Nabawa .....                  | 16.73           | 282 51                    | 16 54                        |
| Experimental .. | Variety Tests .....           | 35.76           | 614 25                    | 17 19                        |
| "               | Federation (Rotational) ..... | 23.31           | 497 2                     | 21 19                        |
| "               | Federation (Manurial) .....   | 34.00           | 552 39                    | 16 15                        |
|                 |                               | 93.07           | 1,664 6                   | 17 53                        |
| Means .....     |                               | 169.89          | 2,898 12                  | 17 4                         |

The area harvested amounted to 169.89 acres, from which 2,898bush. 12lbs. of grain were secured, or an average of 17bush. 4lbs. per acre.

The best return was from Field No. 12. In this field only one variety was left for grain, the remainder being cut for hay. Bena was the variety, and gave 22bush. 18lbs. per acre. Considering the nature of the season this must be regarded as very satisfactory. Other good yields were Federation, 21bush. 19lbs., from the Rotation Plots; Sultan, 18bush. 39lbs.; and Dan, 17bush. 12lbs., from Field No. 13.

*Wheat Returns, Booborowie, 1912-1929.*

| Year.       | Total<br>Rainfall.<br>In. | Useful<br>Rainfall.<br>In. | Area.<br>Acres. | Total<br>Yield.<br>Bush. lbs. | Acres<br>Yield.<br>Bush. lbs. |
|-------------|---------------------------|----------------------------|-----------------|-------------------------------|-------------------------------|
| 1912 .....  | 15.50                     | 13.20                      | 180.00          | 4,645 20                      | 25 48                         |
| 1913 .....  | 15.07                     | 10.86                      | 388.75          | 6,611 53                      | 17 0                          |
| 1914 .....  | 9.76                      | 7.79                       | 339.75          | 990 58                        | 2 55                          |
| 1915 .....  | 17.14                     | 15.95                      | 284.28          | 7,765 2                       | 27 19                         |
| 1916 .....  | 22.41                     | 20.28                      | 216.67          | 7,768 40                      | 35 24                         |
| 1917 .....  | 26.78                     | 21.02                      | 153.22          | 4,984 30                      | 32 32                         |
| 1918 .....  | 13.87                     | 11.98                      | 173.81          | 4,631 32                      | 26 39                         |
| 1919 .....  | 18.39                     | 13.77                      | 113.84          | 3,041 15                      | 26 43                         |
| 1920 .....  | 22.22                     | 19.57                      | 91.51           | 2,937 17                      | 32 5                          |
| 1921 .....  | 20.50                     | 15.46                      | 103.10          | 2,112 32                      | 20 29                         |
| 1922 .....  | 20.32                     | 15.61                      | 66.85           | 1,840 13                      | 27 32                         |
| 1923 .....  | 21.17                     | 18.23                      | 107.70          | 3,392 37                      | 31 30                         |
| 1924 .....  | 24.58                     | 19.37                      | 157.25          | 4,657 56                      | 29 37                         |
| 1925 .....  | 16.36                     | 13.04                      | 205.77          | 4,300 35                      | 20 54                         |
| 1926 .....  | 17.79                     | 16.70                      | 150.63          | 3,013 36                      | 20 0                          |
| 1927 .....  | 13.17                     | 10.36                      | 142.71          | 2,433 12                      | 17 3                          |
| 1928 .....  | 16.91                     | 12.76                      | 216.92          | 3,993 21                      | 18 25                         |
| 1929 .....  | 13.44                     | 9.61                       | 169.89          | 2,898 12                      | 17 4                          |
| Means ..... | 18.39                     | 15.09                      | 3,261.65        | 72,018 41                     | 22 5                          |

The return for this year, 17bush. 4lbs., is practically 5bush. below the average, but an examination of the rainfall figures will explain the cause of the low yield. The best average at Booborowie is 35bush. 24lbs., obtained in 1927, and the poorest, 2bush. 55lbs., secured in 1914, whilst the mean return for wheat is 22bush. 5lbs. per acre.



## WHEAT VARIETIES.

Each year a number of wheat varieties are submitted to test under identical conditions of soil and tillage in order that the yields secured may be compared one with the other.

This season the experiment was conducted in Fields 4, 5, 6, the plots each being at least two acres, and not more than five acres in area. All varieties were harvested after the rain which fell late in December.

The yields secured together with the mean figures for the 1924-29 period are submitted in the following table:—

*Wheat Varieties, Booborowie, 1924-29.*

| Variety.              | 1924. |    | 1925. |    | 1926. |    | 1927. |    | 1928. |    | 1929. |    | Mean<br>1924-29. |    |
|-----------------------|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|------------------|----|
|                       | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.               | L. |
| Merredin . . . . .    | 33    | 26 | 27    | 17 | 26    | 6  | 19    | 21 | 17    | 50 | 17    | 39 | 24               | 17 |
| Federation . . . . .  | 30    | 38 | 22    | 15 | 23    | 16 | 19    | 48 | 24    | 58 | 23    | 1  | 23               | 59 |
| Dan . . . . .         | 36    | 52 | 25    | 51 | 21    | 2  | 15    | 22 | 23    | 13 | 18    | 26 | 23               | 28 |
| Nabawa . . . . .      | 37    | 50 | 20    | 31 | 17    | 17 | 25    | 18 | 19    | 26 | 11    | 32 | 21               | 59 |
| Caliph . . . . .      | 33    | 50 | 17    | 15 | 27    | 33 | 6     | 28 | 20    | 23 | 14    | 10 | 21               | 27 |
| Carrabin . . . . .    | 35    | 51 | 18    | 22 | 9     | 51 | 24    | 40 | 19    | 59 | 16    | 43 | 20               | 54 |
| Major . . . . .       | 27    | 37 | 16    | 18 | —     | —  | 17    | 23 | 28    | 26 | 22    | 7  | —                | —  |
| Bena . . . . .        | —     | —  | —     | —  | —     | —  | 20    | 50 | 15    | 17 | 21    | 33 | —                | —  |
| Glede . . . . .       | —     | —  | —     | —  | 19    | 49 | 10    | 11 | 16    | 5  | 20    | 21 | —                | —  |
| Turvey . . . . .      | —     | —  | —     | —  | —     | —  | —     | —  | 26    | 7  | 20    | 16 | —                | —  |
| Calibre . . . . .     | —     | —  | —     | —  | 23    | 53 | —     | —  | 16    | 11 | 19    | 33 | —                | —  |
| Sultan . . . . .      | —     | —  | 33    | 3  | 28    | 20 | 19    | 0  | 14    | 27 | 15    | 11 | —                | —  |
| Late Gluyas . . . . . | —     | —  | 18    | 32 | 20    | 5  | 18    | 12 | 15    | 2  | 13    | 47 | —                | —  |
| Preference . . . . .  | —     | —  | —     | —  | —     | —  | —     | —  | —     | —  | 13    | 11 | —                | —  |
| Defiance . . . . .    | —     | —  | —     | —  | —     | —  | —     | —  | —     | —  | 11    | 25 | —                | —  |
| Ford . . . . .        | —     | —  | 30    | 7  | 19    | 16 | 15    | 25 | 12    | 30 | 11    | 4  | —                | —  |

Federation heads the yields for this season, with a return of 23bush. 11b. per acre. Next follows Major, 22bush. 7lbs., and Bena in third position with 21bush. 33lbs. Other varieties which exceed the 20bush. mark are Glede and Turvey with 20bush. 21lbs. and 20bush. 16lbs., respectively. These latter wheats are not as well known as those previously mentioned. Glede was bred at Roseworthy Agricultural College by crossing Gluyas with Federation, and therefore claims the same parents as Merredin. Turvey was a selection from Marshall's No. 3 made by Mr. Turvey, of Rochester, Victoria, and at one time was known by the name of Stump. The low yields from Nabawa, Ford, and Caliph were due to lodging, whilst Defiance shattered badly before harvesting. The average for the six-year period shows Merredin as the best yielder at Booborowie. This variety has a mean yield of 24bush. 17lbs. per acre.

Federation follows closely with 23bush. 59lbs., whilst Dan has the very creditable average of 23bush. 28lbs.

## EXPERIMENTAL PLOTS.

Permanent experiments have been conducted at Booborowie since 1916.

A full report of the Tillage and Manurial trials was published last year. This season we have no additional yields to record from these experiments, as owing to a reduction in the amount of money available for labor we were not able to afford the additional expense involved in reaping each plot separately, and in consequence the whole series were harvested in one block. However, the Rotational Experiments have received the usual attention, and the results secured over the 1917-29 period may now be reported upon.



## (C) ROTATIONAL EXPERIMENTS.

(Continued from Page 930.)

The systems of cropping included in these trials are as follows:—

|                    |                                                            |
|--------------------|------------------------------------------------------------|
| Single Crop .....  | Permanent Grazing                                          |
| Two Course .....   | Bare fallow—Wheat                                          |
| “ .....            | Summer Crop—Wheat                                          |
| Three Course ..... | Bare fallow—Wheat (No Manure) Pasture                      |
| “ .....            | Bare fallow—Wheat ( $\frac{1}{2}$ cwt. 36% Super.) Pasture |
| “ .....            | Bare fallow—Wheat (1cwt. 36% Super.) Pasture               |
| “ .....            | Bare fallow—Wheat (2cwts. 36% Super.) Pasture              |
| “ .....            | Bare fallow—Wheat (3cwts. 36% Super.) Pasture              |
| “ .....            | Bare fallow—Wheat, Barley                                  |
| “ .....            | Bare fallow—Wheat, Oats                                    |
| “ .....            | Bare fallow—Wheat, Pease                                   |
| “ .....            | Bare fallow—Wheat, Rape                                    |
| Four Course .....  | Bare fallow—Wheat, Barley, Pasture                         |
| “ .....            | Bare fallow—Wheat, Oats, Pasture                           |
| “ .....            | Bare fallow—Wheat, Rye Grass, Rye Grass                    |
| Five Course .....  | Bare fallow—Wheat, Lucerne, Lucerne, Lucerne               |

## MONETARY VALUES.

Any comparison of rotation experiments involves reducing the yields secured to a cash basis and deducting the expenses incurred. It is therefore necessary to arrive at a value for each crop, and also the cost of production. The Turretfield figures have been largely availed of, and the following are adopted in this report:—

|                                |                                                 |
|--------------------------------|-------------------------------------------------|
| Wheat .....                    | 4s. 6d. per bushel                              |
| Barley .....                   | 3s. 0d. per bushel                              |
| Oats .....                     | 2s. 6d. per bushel                              |
| Sheep grazing .....            | 11s. 7d. per head per annum (including rent)    |
| Cost of growing—               | £ s. d.                                         |
| Wheat on fallow .....          | 3 12 11 Exclusive of rent and manure            |
| Wheat on Sorghum Stubble ..... | 2 15 1 Exclusive of rent and manure             |
| Barley .....                   | 1 19 5 Exclusive of rent and manure             |
| Oats .....                     | 2 3 3 Exclusive of rent and manure              |
| Pease .....                    | 2 8 2 Exclusive of rent, manure, and harvesting |
| Rape .....                     | 1 18 0 Exclusive of rent and manure             |
| Sorghum .....                  | 3 0 0 Exclusive of rent                         |
| Rye Grass .....                | 0 5 0 Exclusive of rent                         |
| Lucerne .....                  | 0 16 6 Exclusive of rent                        |
| Rent .....                     | 0 12 6 per acre                                 |
| Superphosphate 36% .....       | 0 5 0 per cwt.                                  |

The values allotted call for some explanation:—

The value of 11s. 7d. for sheep grazing is the net revenue per head without any deduction being made for rent. This figure was obtained by deducting from the gross revenue for sheep at Turretfield, the cost of tending the flock, handfeeding, watering, marketing, incidentals, and inventory differences. The balance was divided by the average number of sheep carried, including, lambs, hoggets, ewes, etc., and resulted in the amount adopted. No figures are available regarding the cost of growing wheat after a summer crop, and those relating to sowing after pease have been utilised. The cost of sowing rape has been considered equal to that of pease, except for the difference in the value of the seed.

The Rye Grass and Lucerne are each sown on the land prepared for the wheat crop, and the only charge made against these pastures is the cost of the seed plus 1s. 6d. per acre for broadcasting.

The summer crop receives a dressing of 10 tons of Farmyard Manure per acre, and an estimated cost of £3 per acre is probably on the conservative side.

Water is not laid on to each plot, and therefore it is difficult to graze the stubbles individually. Occasionally stubble grazing has been possible, and our records show a carrying capacity of approximately  $1\frac{1}{2}$  sheep per acre per annum. A flat rate of 15s. per acre has been adopted as the value of stubble grazing.



### SINGLE CROP.

In 1919 it was decided to set aside one plot for a permanent grazing test. This is natural pasture, and careful record has been kept regarding the stock it has carried.

A top-dressing of lewt. 36 per cent. superphosphate was applied for the first time in 1924, and a similar quantity applied in each succeeding season. The results secured are shown below:—

Grazing returns from land not cropped, but left out as natural pasture:—

*Sheep Per Acre.*

[illegible]

Over the 11-year period the natural pasture has carried 2.28 sheep per acre per annum, which at 11s. 7d. per head equal an annual return of £1 6s. 5d.

The top-dressing costs 8s. per acre (5s. for manure, 3s. for drilling), but as this has only been applied since 1924, an average cost of 4s. 4d. per acre must be deducted for this item.

When rent is also taken into consideration, the profit per acre from permanent grazing amounts to 9s. 11d. per acre.

### TWO COURSE ROTATIONS.

Two forms of Two Course Rotations are undergoing test, and the results from the Bare-Fallow-Wheat system, which may be regarded as the standard for comparison of rotations, are submitted in the following table:—

*Returns from Wheat grown continuously after Bare Fallow, with 2cwt. Superphosphate per acre.*

| Year.        | Grain per Acre |           |
|--------------|----------------|-----------|
|              | Bush.          | lbs.      |
| 1917         | 35             | 33        |
| 1918         | 26             | 20        |
| 1919         | 22             | 32        |
| 1920         | 30             | 54        |
| 1921         | 24             | 25        |
| 1922         | 27             | 22        |
| 1923         | 32             | 26        |
| 1924         | 27             | 57        |
| 1925         | 26             | 15        |
| 1926         | 26             | 11        |
| 1927         | 24             | 50        |
| 1928         | 25             | 8         |
| 1929         | 19             | 45        |
| <b>Means</b> | <b>26</b>      | <b>52</b> |



## **TOP BRAND FERTILIZER APPEAL.**

I came from the depths of the earth, from the waters of the sea, from the atmosphere we breathe. My sources are worldwide.

I offer myself as a servant of the Primary Producer, and, in the end, I am free—I pay for myself several times over.

I feed the plants, increase the yield, lower cost of production, make labour more profitable, and release land needed for other purposes.

I make two blades to grow where one grew before, providing feed and food where hunger would prevail. I make possible profit where otherwise loss would accrue. And, while I serve, I leave with the soil a portion of myself which forms a residual asset for years to come.

Plants, like all other forms of life, must feed. It is my function to furnish food for plant life.

I am a service. All I need is an opportunity to show what I can do. Experiment stations throughout the land have given me this opportunity—have tried me out and found my ability not wanting. Farmers everywhere testify to my power.

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**TOP SPECIAL SUPER (45% W.S.P.)**

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which milks two or three cows at once  
and takes half the energy required  
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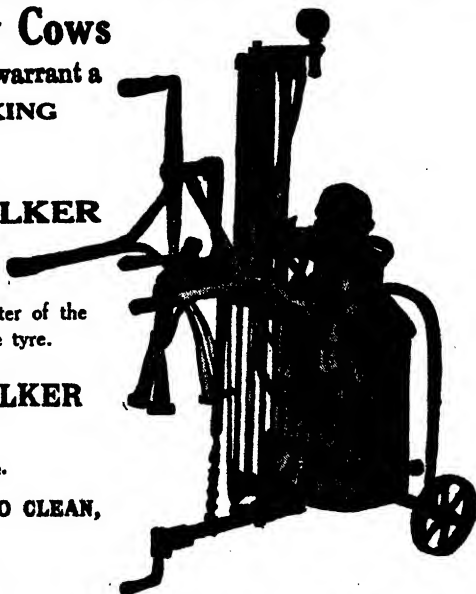
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*Returns from Wheat grown continuously after Bare Fallow, with 2cwt. Superphosphate per acre—continued.*

|                                             |                |
|---------------------------------------------|----------------|
| <i>Receipts—</i>                            | £ s. d.        |
| Wheat crop . . . . .                        | 6 1 0          |
| Stubble grazing . . . . .                   | 0 15 0         |
| <b>Total receipts . . . . .</b>             | <b>£6 16 0</b> |
| <i>Expenditure—</i>                         | £ s. d.        |
| Wheat crop . . . . .                        | 4 2 11         |
| Rent (two years) . . . . .                  | 1 5 0          |
| <b>Total expenditure . . . . .</b>          | <b>£5 7 11</b> |
| Balance receipts over expenditure . . . . . | 1 8 1          |
| Profit per acre per annum . . . . .         | 0 14 1         |

From the above table it will be seen that the average yield from land regularly cropped every other year and fallowed in the alternate years is 26bush. 53lbs.

With wheat at 4s. 6d. per bushel this equals £6 1s. per acre. The stubbles at Booborowie are thick and flaggy, and the grazing value amounts to 15s. per acre. In addition, there would be a certain amount of early winter, and at times fallow grazing, but as we have no means of measuring these items, the total receipts consist of those from the crop and stubble grazing, amounting in all to £6 16s.

The expenditure comprises the cost of growing the wheat crop and rent for two years. This leaves a credit balance of £1 8s. 1d. for the rotation, or 14s. 1d. per acre per annum.

*Returns from Wheat after Summer Crop, comparatively with Wheat after Bare Fallow, 1917-1929.*

|                                     | Wheat after<br>Bare Fallow. |             | Wheat after<br>Summer Crop. |             | Grazing<br>Summer Crop.<br>Sheep per Acre. |
|-------------------------------------|-----------------------------|-------------|-----------------------------|-------------|--------------------------------------------|
|                                     | B.                          | L.          | B.                          | L.          |                                            |
| 1917 . . . . .                      | 32                          | 22          | 31                          | 50          | 0-00                                       |
| 1918 . . . . .                      | 23                          | 10          | 19                          | 49          | 2-90                                       |
| 1919 . . . . .                      | 23                          | 5           | 24                          | 37          | 2-13                                       |
| 1920 . . . . .                      | 28                          | 9           | 31                          | 50          | 3-49                                       |
| 1921 . . . . .                      | 24                          | 0           | 16                          | 37          | 4-53                                       |
| 1922 . . . . .                      | 30                          | 29          | 30                          | 8           | 2-17                                       |
| 1923 . . . . .                      | 32                          | 28          | 28                          | 41          | 1-32                                       |
| 1924 . . . . .                      | 30                          | 41          | 31                          | 36          | 1-26                                       |
| 1925 . . . . .                      | 25                          | 44          | 24                          | 38          | 1-16                                       |
| 1926 . . . . .                      | 25                          | 54          | 14                          | 58          | 1-16                                       |
| 1927 . . . . .                      | 25                          | 44          | 23                          | 22          | 0-00                                       |
| 1928 . . . . .                      | 25                          | 14          | 19                          | 33          | 0-10                                       |
| 1929 . . . . .                      | 18                          | 46          | 19                          | 33          | 0-58                                       |
| <b>Means . . . . .</b>              | <b>26</b>                   | <b>36</b>   | <b>24</b>                   | <b>24</b>   | <b>1-60</b>                                |
|                                     | £ s. d.                     |             | £ s. d.                     |             |                                            |
| <i>Receipts—</i>                    |                             |             |                             |             |                                            |
| Wheat crop . . . . .                | 5                           | 19 8        | 5                           | 9 10        |                                            |
| Summer crop . . . . .               | —                           |             | 0                           | 18 6        |                                            |
| Stubble grazing . . . . .           | 0                           | 15 0        | 0                           | 15 0        |                                            |
| <b>Total Receipts . . . . .</b>     | <b>6</b>                    | <b>14 8</b> | <b>7</b>                    | <b>3 4</b>  |                                            |
| <i>Expenditure—</i>                 |                             |             |                             |             |                                            |
| Wheat crop . . . . .                | 4                           | 2 11        | 3                           | 5 1         |                                            |
| Summer crop . . . . .               | —                           |             | 3                           | 0 0         |                                            |
| Rent (two years) . . . . .          | 1                           | 5 0         | 1                           | 5 0         |                                            |
| <b>Total Expenditure . . . . .</b>  | <b>5</b>                    | <b>7 11</b> | <b>7</b>                    | <b>10 1</b> |                                            |
| Balance—Receipts over Expenditure   | 1                           | 6 9         | 0                           | 6 9         |                                            |
| Profit per acre per annum . . . . . | 0                           | 13 5        | loss                        | 0 3 4       |                                            |

In the above two-course rotation the wheat crop is preceded by a summer crop instead of Bare Fallow. The summer crop, formerly sorghum, but of recent years Sudan grass, is sown in rows and kept well cultivated. It is regularly dressed with 10 tons of



farmyard manure per acre, and the wheat crop receives a dressing of 2cwts. 36 per cent. superphosphate. The development of the summer crop has not been particularly successful. In the years 1920 and 1921 good growth resulted, the grazing amounting to 3.49 and 4.53 sheep per acre respectively. However, in both 1917 and 1927 the summer crop was a complete failure, whilst practically no feed was obtained in 1928.

Everything depends on the summer rainfall, which at Booborowie is very irregular.

The average carrying capacity of the summer crop in this rotation is 1.60 sheep per acre, which at 11s. 7d. per head amounts to 18s. 6d. as the value for the crop. The cost of sowing when dressed with 10 tons of farmyard manure has been estimated at £3 per acre, and notwithstanding the fact that the soil preparation reduces the subsequent cost for the wheat crop, it is evident that Sudan grass has proved a very expensive crop in this district. Comparing the wheat yields obtained after bare fallow, and after a summer crop, it will be observed that the former amounts to 26bush. 36lbs. per acre, and the latter 24bush. 24lbs. The summer crop has therefore had the effect of depressing the yield by 2bush. 12lbs.

When all receipts and expenditure have been taken into consideration, the profit per acre from the bare fallow—wheat rotation is 13s. 5d. per acre, and the loss on the summer crop—wheat rotation 3s. 4d., making a difference of 16s. 9d. in favor of the former. The application of 10 tons of farmyard manure is very costly, and if this is ignored the debit balance against the summer crop rotation is practically wiped out. Moreover the Sudan grass provides grazing at a time of the year when green fodder is most valuable.

#### THREE-COURSE ROTATIONS.

In addition to a number of three-course rotations in which the land is sown with a secondary crop in the third year, we have another series—bare fallow, wheat, pasture—the latter comprising the natural grazing which springs up spontaneously after the wheat crop.

With this system of cropping, opportunity was taken of testing the influence of various dressings of superphosphate on the wheat yield, and subsequent residual effect on the pasture which follows in the grazing year. The results obtained are set out in the following table:—

*Returns from Bare Fallow, Wheat, Pasture Rotation in which the Wheat Crop is regularly dressed with varying quantities of Superphosphate, 1917-1929.*

#### (A) Grain Yields.

|             | No Manure. |    | ½cwt. 36% Super. |    | 1cwt. 36% Super. |    | 2cwts. 36% Super. |    | 3cwts. 36% Super. |    |
|-------------|------------|----|------------------|----|------------------|----|-------------------|----|-------------------|----|
|             | B.         | L. | B.               | L. | B.               | L. | B.                | L. | B.                | L. |
| 1917 .....  | 25         | 40 | 35               | 10 | 36               | 6  | 36                | 48 | 32                | 58 |
| 1918 .....  | 15         | 40 | 26               | 5  | 27               | 56 | 23                | 55 | 25                | 43 |
| 1919 .....  | 20         | 6  | 29               | 53 | 28               | 28 | 28                | 41 | 27                | 26 |
| 1920 .....  | 22         | 17 | 35               | 54 | 35               | 51 | 33                | 1  | 32                | 17 |
| 1921 .....  | 16         | 44 | 23               | 14 | 22               | 36 | 23                | 43 | 25                | 1  |
| 1922 .....  | 16         | 56 | 33               | 18 | 38               | 24 | 30                | 43 | 24                | 43 |
| 1923 .....  | 18         | 53 | 33               | 24 | 33               | 1  | 31                | 25 | 25                | 34 |
| 1924 .....  | 23         | 9  | 33               | 25 | 33               | 12 | 36                | 22 | 35                | 25 |
| 1925 .....  | 11         | 45 | 23               | 39 | 26               | 22 | 27                | 59 | 25                | 56 |
| 1926 .....  | 12         | 19 | 28               | 23 | 30               | 29 | 30                | 10 | 27                | 12 |
| 1927 .....  | 14         | 33 | 25               | 41 | 25               | 53 | 26                | 26 | 29                | 21 |
| 1928 .....  | 17         | 58 | 25               | 37 | 26               | 7  | 25                | 4  | 24                | 37 |
| 1929 .....  | 8          | 32 | 24               | 18 | 27               | 1  | 27                | 16 | 27                | 0  |
| Means ..... | 17         | 17 | 29               | 5  | 30               | 7  | 29                | 21 | 28                | 42 |



(B) *Grazing Yields.*

## Sheep Per Acre for Pasture Year.

|                            |         |         |         |         |         |
|----------------------------|---------|---------|---------|---------|---------|
| 1917 .....                 | 0.89    | 1.28    | 0.85    | 1.55    | 1.24    |
| 1918 .....                 | 0.57    | 0.99    | 1.29    | 0.99    | 0.71    |
| 1919 .....                 | 2.61    | 2.61    | 2.09    | 2.46    | 2.32    |
| 1920 .....                 | 4.21    | 3.60    | 3.60    | 3.79    | 4.49    |
| 1921 .....                 | 2.39    | 3.18    | 2.37    | 4.34    | 4.80    |
| 1922 .....                 | 2.24    | 3.42    | 3.42    | 3.65    | 3.38    |
| 1923 .....                 | 2.14    | 2.78    | 2.78    | 2.78    | 2.06    |
| 1924 .....                 | 1.05    | 1.45    | 1.45    | 2.09    | 1.66    |
| 1925 .....                 | 0.49    | 1.46    | 0.98    | 1.46    | 1.95    |
| 1926 .....                 | 1.53    | 2.31    | 2.70    | 2.70    | 3.28    |
| 1927 .....                 | 0.60    | 1.21    | 1.21    | 1.21    | 1.21    |
| 1928 .....                 | 0.98    | 1.30    | 2.07    | 1.89    | 2.05    |
| 1929 .....                 | 0.39    | 0.97    | 0.97    | 1.16    | 1.16    |
| Means .....                | 1.55    | 2.04    | 1.98    | 2.31    | 2.33    |
| <i>Receipts—</i>           | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Wheat Crop .....           | 3 17 9  | 6 10 11 | 6 15 6  | 6 12 1  | 6 9 2   |
| Grazing Year .....         | 0 17 11 | 1 3 8   | 1 3 0   | 1 6 9   | 1 7 0   |
| Stubble Grazing .....      | 0 15 0  | 0 15 0  | 0 15 0  | 0 15 0  | 0 15 0  |
| Total Receipts ....        | 5 10 8  | 8 9 7   | 8 13 6  | 8 13 10 | 8 11 2  |
| <i>Expenditure—</i>        |         |         |         |         |         |
| Wheat Crop .....           | 3 12 11 | 3 15 5  | 3 17 11 | 4 2 11  | 4 7 11  |
| Rent (three years)....     | 1 7 6   | 1 7 6   | 1 7 6   | 1 7 6   | 1 7 6   |
| Total Expenditure .        | 5 0 5   | 5 2 11  | 5 5 5   | 5 10 5  | 5 15 5  |
| Balance—Receipts over Ex-  |         |         |         |         |         |
| penditure .....            | 0 10 3  | 3 6 8   | 3 8 1   | 3 3 5   | 2 15 9  |
| Profit per acre per annum. | 0 3 5   | 1 2 3   | 1 2 8   | 1 1 2   | 0 18 7  |

Dealing with the wheat yields received from the varying applications of superphosphate. From the above figures, it will be seen that the 1cwt. dressing has given the best return with an average of 30bush. 7lbs. This exceeds the 2cwts. dressing by 46lbs., but there is not much variation between the yields from any of the remaining plots receiving manure, the  $\frac{1}{2}$ cwt. dressing giving 29bush. 5lbs.; the 2cwts., 29bush. 21lbs.; and 3cwts., 28bush. 42lbs.

However, there is a marked increase with even small dressings of superphosphate, the No Manure plot only averaging 17bush. 7lbs. per acre. After deducting the cost of the manure (5s. per cwt.), when the crop alone is taken into consideration, the most profitable application is 1cwt. of superphosphate. The pasture in the grazing year receives no additional manure, and we now have to examine the residual effect of the superphosphate applied with the wheat crop on the grazing which follows. The figures show that the greatest number of sheep have been carried on the pasture preceded by a wheat crop receiving 3cwts. superphosphate. Except that the sheep-carrying capacity following the  $\frac{1}{2}$ cwt. and 1cwt. applications is practically equal, there has been a gradual increase in grazing with the quantity of manure utilised. Thus contrary to the grain yields, the maximum pasture has followed the heaviest dressing of superphosphate. The fact that the number of sheep carried average  $2\frac{1}{2}$  head per acre per annum illustrates the grazing quality of Booborowie land. When both the value of the crop and grazing yields are taken into consideration, the total monetary return shows that the greatest cash revenue is secured from the series in which the wheat crop receives a dressing of 2cwts. of superphosphate. However, when the expense of cropping and the rental of the land is deducted, the most profitable rotation is that in which the wheat secures 1cwt. of manure. On a per acre basis the No Manure has returned a profit of 3s. 5d.;  $\frac{1}{2}$ cwt. superphosphate, £1 2s. 3d.; 1cwt., £1 2s. 8d.; 2cwts. £1 1s. 2d.; and 3cwts., 18s. 7d.



*Returns from Three-Course Rotations—Bare Fallow, Wheat, Barley; Bare Fallow, Wheat, Oats; Bare Fallow, Wheat, Pease; and Bare Fallow, Wheat, Rape (1917/29).*

| Year.                             | B.F. Wheat. |         | Barley. |       | B.F. Wheat. |       | Oats.   |      | B.F. Wheat. |       | Pea. | B.F. Wheat. |       | Rape. |
|-----------------------------------|-------------|---------|---------|-------|-------------|-------|---------|------|-------------|-------|------|-------------|-------|-------|
|                                   | Wheat.      | Barley. | Wheat.  | Oats. | Wheat.      | Oats. | Wheat.  | Pea. | Wheat.      | Rape. |      | Wheat.      | Rape. |       |
| 1917 .....                        | 88 38       | 18 5    | 41 52   | 45 32 | 89 17       | 2-15  | 45 27   | 1-59 |             |       |      |             |       |       |
| 1918 .....                        | 27 6        | 27 17   | 28 18   | 43 18 | 24 2        | 1-19  | 23 11   | 1-41 |             |       |      |             |       |       |
| 1919 .....                        | 25 13       | 15 19   | 26 26   | 14 30 | 28 39       | 2-15  | 24 16   | 0-74 |             |       |      |             |       |       |
| 1920 .....                        | 38 23       | 20 13   | 38 6    | 42 32 | 37 24       | 5-39  | 35 20   | 6-48 |             |       |      |             |       |       |
| 1921 .....                        | 22 22       | 15 45   | 20 27   | 34 8  | 20 41       | 4-49  | 21 8    | 0-81 |             |       |      |             |       |       |
| 1922 .....                        | 33 23       | 29 43   | 31 4    | 38 7  | 33 2        | 2-57  | 24 57   | 1-52 |             |       |      |             |       |       |
| 1923 .....                        | 29 11       | 19 3    | 39 27   | 36 23 | 39 33       | 1-77  | 40 37   | 2-54 |             |       |      |             |       |       |
| 1924 .....                        | 32 9        | 20 49   | 32 10   | 10 27 | 32 15       | 2-52  | 30 3    | 2-25 |             |       |      |             |       |       |
| 1925 .....                        | 15 56       | 2 12    | 30 23   | 18 13 | 29 51       | 1-43  | 25 52   | 1-20 |             |       |      |             |       |       |
| 1926 .....                        | 28 34       | 5 14    | 25 54   | 14 18 | 22 3        | 2-15  | 24 44   | 1-59 |             |       |      |             |       |       |
| 1927 .....                        | 23 31       | 11 40   | 26 18   | 17 21 | 23 8        | 1-43  | 23 53   | 0-86 |             |       |      |             |       |       |
| 1928 .....                        | 22 47       | 21 28   | 28 18   | 33 13 | 23 57       | 2-01  | 23 33   | 1-72 |             |       |      |             |       |       |
| 1929 .....                        | 20 37       | 2 8     | 21 16   | 6 28  | 22 24       | 0-96  | 20 2    | 0-64 |             |       |      |             |       |       |
| Means .....                       | 27 8        | 16 13   | 30 0    | 27 18 | 28 57       | 2-32  | 27 55   | 1-76 |             |       |      |             |       |       |
| <b>Receipts—</b>                  | £ s. d.     |         | £ s. d. |       | £ s. d.     |       | £ s. d. |      | £ s. d.     |       |      | £ s. d.     |       |       |
| Wheat Crop ...                    | 6           | 2 1     | 6       | 15 0  | 6           | 10 3  | 6       | 5 8  |             |       |      |             |       |       |
| Barley Crop ...                   | 2           | 8 9     | —       | —     | —           | —     | —       | —    |             |       |      |             |       |       |
| Oat Crop .....                    | —           | —       | 3       | 8 8   | —           | —     | —       | —    |             |       |      |             |       |       |
| Grazing Crop ..                   | —           | —       | —       | —     | 1           | 6 10  | 1       | 0 4  |             |       |      |             |       |       |
| Stubble Grazing                   | 1           | 10 0    | 1       | 10 0  | 0           | 15 0  | 0       | 15 0 |             |       |      |             |       |       |
| <b>Total Receipts</b>             | 10          | 0 10    | 11      | 13 8  | 8           | 12 1  | 8       | 1 0  |             |       |      |             |       |       |
| <b>Expenditure—</b>               | £ s. d.     |         | £ s. d. |       | £ s. d.     |       | £ s. d. |      | £ s. d.     |       |      | £ s. d.     |       |       |
| Wheat Crop ...                    | 4           | 2 11    | 4       | 2 11  | 4           | 2 11  | 4       | 2 11 |             |       |      |             |       |       |
| Barley Crop ...                   | 2           | 4 5     | —       | —     | —           | —     | —       | —    |             |       |      |             |       |       |
| Oat Crop .....                    | —           | —       | 2       | 8 3   | —           | —     | —       | —    |             |       |      |             |       |       |
| Pea Crop .....                    | —           | —       | —       | —     | 2           | 13 2  | —       | —    |             |       |      |             |       |       |
| Rape Crop .....                   | —           | —       | —       | —     | —           | —     | 1       | 18 0 |             |       |      |             |       |       |
| Rent (3 years) .                  | 1           | 7 6     | 1       | 7 6   | 1           | 7 6   | 1       | 7 6  |             |       |      |             |       |       |
| <b>Total Expenditure</b>          | 7           | 14 10   | 7       | 18 8  | 8           | 3 7   | 7       | 8 5  |             |       |      |             |       |       |
| Balance—Receipts over Expenditure | 2           | 6 0     | 3       | 15 0  | 0           | 8 6   | 0       | 12 7 |             |       |      |             |       |       |
| Profit per Acre per Annum .....   | 0           | 15 4    | 1       | 5 0   | 0           | 2 10  | 0       | 4 2  |             |       |      |             |       |       |

In these rotations the wheat crops receive a dressing of 2cwt. 36 per cent. superphosphate, and the barley, oats, pease, or rape a 1cwt. application.

The highest wheat yield has been obtained from the Bare Fallow, Wheat, Oats rotation, namely, 30bush. per acre, and the lowest yield 27bush. 8lbs. from the system of cropping including barley. It is difficult to account for the variations in wheat yield from the four rotations under review, as if the secondary crop had influence it would be reasonable to anticipate that the highest return would be secured from the rotation including a leguminous crop such as pease.

The barley crops have not been satisfactory, averaging only 16bush. 13lbs. per acre.

Oaten crops have yielded consistently better, and show a mean return of 27bush. 18lbs.

The grazing from the pea and rape crops has fluctuated considerably according to the character of the season, being particularly good in 1921. The mean returns are 2.32 and 1.76 sheep per acre respectively.

It will be noted that on the line dealing with stubble grazing, the value of two stubbles has been credited to those rotations including two cereal crops. The carrying capacity of both oaten and barley stubble has been considered equal to that of wheaten stubble.

The cost of producing the various crops and the rental value of the land occupied has been calculated, and after deduction from the total receipts a net profit per acre of £1 5s. for Bare Fallow, Wheat, Oats rotation; 15s. 4d. for Bare Fallow, Wheat, Barley; 2s. 10d. for Bare Fallow, Wheat, Pease; and 4s. 2d. for Bare Fallow, Wheat, Rape is shown. These figures are comparative with £1 2s. 8d. secured from the Bare Fallow, Wheat, Pasture rotation as given in the previous table. The small net profit from the rotations in which special preparation of the land is necessary for the sowing of the grazing crop illustrates the necessity of high grazing returns if this practice is to prove profitable.



For example, the pea crop cost £2 13s. 2d. to seed. With sheep grazing valued at 11s. 7d. per head, this means that almost five sheep per acre must be pastured in order to cover expenses.

#### FOUR-COURSE ROTATIONS.

The are three four-course rotations undergoing test. The wheat crop is preceded by a year of bare fallow, and in two series is followed by a second cereal crop, barley and oats, then left out as pasture for one year before being fallowed again. In the third series the wheat crop is followed by pasture for two years. The grazing in this case consisting of Italian Rye Grass sown at the rate of 9½lbs. per acre in the stubble of the wheat crop. The cereals, wheat, barley, and oats each receive a dressing of 2cwt. 36 per cent. superphosphate per acre, but the pasture is not manured.

*Returns from Four-Course Rotations—Bare Fallow, Wheat, Barley, Pasture; Bare Fallow, Wheat, Oats, Pasture; and Bare Fallow, Wheat, Rye Grass, Rye Grass (1917-29).*

| B.F. Wheat.                            |    |    | Barley. |    |      | Pasture. |    |        | B.F. Wheat. |      |    | Oats.   |      |    | Pasture. |      |        | B.F. Wheat. |      |    | Rye Grass. |      |        | Rye Grass.               |      |        |                         |  |  |
|----------------------------------------|----|----|---------|----|------|----------|----|--------|-------------|------|----|---------|------|----|----------|------|--------|-------------|------|----|------------|------|--------|--------------------------|------|--------|-------------------------|--|--|
| Year.                                  |    |    | Wheat.  |    |      | Barley.  |    |        | Pasture.    |      |    | Wheat.  |      |    | Oats.    |      |        | Pasture.    |      |    | Wheat.     |      |        | Rye Grass<br>(1st Year). |      |        | Rye Grass<br>(2nd Year) |  |  |
|                                        |    |    | B.      | L. |      | B.       | L. | Sheep. | B.          | L.   |    | B.      | L.   |    | B.       | L.   | Sheep. | B.          | L.   |    | B.         | L.   | Sheep. | B.                       | L.   | Sheep. |                         |  |  |
| 1917 ..                                | 37 | 56 | 27      | 43 | 1.23 | 39       | 25 | 43     | 24          | 1.46 | 32 | 45      | 2.20 | 32 | 45       | 2.20 | 32     | 45          | 2.20 | 32 | 45         | 2.20 | 32     | 45                       | 2.20 |        |                         |  |  |
| 1918 ..                                | 27 | 19 | 37      | 28 | 1.27 | 28       | 54 | 41     | 3           | 1.47 | 25 | 26      | 1.53 | 25 | 26       | 1.53 | 25     | 26          | 1.53 | 25 | 26         | 1.53 | 25     | 26                       | 1.53 |        |                         |  |  |
| 1919 ..                                | 27 | 24 | 14      | 5  | 1.78 | 28       | 11 | 12     | 13          | 1.81 | 23 | 45      | 1.77 | 23 | 45       | 1.77 | 23     | 45          | 1.77 | 23 | 45         | 1.77 | 23     | 45                       | 1.77 |        |                         |  |  |
| 1920 ..                                | 33 | 12 | 24      | 1  | 2.53 | 36       | 57 | 38     | 27          | 3.95 | 32 | 19      | 4.85 | 32 | 19       | 4.85 | 32     | 19          | 4.85 | 32 | 19         | 4.85 | 32     | 19                       | 4.85 |        |                         |  |  |
| 1921 ..                                | 19 | 57 | 14      | 49 | 2.73 | 22       | 52 | 19     | 21          | 2.67 | 21 | 7       | 3.54 | 21 | 7        | 3.54 | 21     | 7           | 3.54 | 21 | 7          | 3.54 | 21     | 7                        | 3.54 |        |                         |  |  |
| 1922 ..                                | 23 | 31 | 32      | 25 | 3.17 | 29       | 50 | 33     | 1           | 2.08 | 31 | 48      | 2.13 | 31 | 48       | 2.13 | 31     | 48          | 2.13 | 31 | 48         | 2.13 | 31     | 48                       | 2.13 |        |                         |  |  |
| 1923 ..                                | 33 | 39 | 3       | 17 | 1.67 | 33       | 17 | 36     | 27          | 2.32 | 32 | 5       | 2.69 | 32 | 5        | 2.69 | 32     | 5           | 2.69 | 32 | 5          | 2.69 | 32     | 5                        | 2.69 |        |                         |  |  |
| 1924 ..                                | 28 | 14 | 19      | 33 | 1.30 | 36       | 1  | 8      | 31          | 2.37 | 28 | 36      | 2.83 | 28 | 36       | 2.83 | 28     | 36          | 2.83 | 28 | 36         | 2.83 | 28     | 36                       | 2.83 |        |                         |  |  |
| 1925 ..                                | 23 | 42 | 7       | 34 | 0.82 | 25       | 32 | 18     | 0           | 1.22 | 28 | 28      | 2.20 | 28 | 28       | 2.20 | 28     | 28          | 2.20 | 28 | 28         | 2.20 | 28     | 28                       | 2.20 |        |                         |  |  |
| 1926 ..                                | 21 | 41 | 8       | 44 | 1.95 | 30       | 36 | 17     | 29          | 2.04 | 25 | 41      | 2.26 | 25 | 41       | 2.26 | 25     | 41          | 2.26 | 25 | 41         | 2.26 | 25     | 41                       | 2.26 |        |                         |  |  |
| 1927 ..                                | 27 | 2  | 15      | 36 | 0.29 | 25       | 28 | 15     | 29          | 0.28 | 23 | 30      | 0.08 | 23 | 30       | 0.08 | 23     | 30          | 0.08 | 23 | 30         | 0.08 | 23     | 30                       | 0.08 |        |                         |  |  |
| 1928 ..                                | 20 | 42 | 35      | 2  | 2.04 | 30       | 26 | 38     | 9           | 1.10 | 23 | 48      | 1.82 | 23 | 48       | 1.82 | 23     | 48          | 1.82 | 23 | 48         | 1.82 | 23     | 48                       | 1.82 |        |                         |  |  |
| 1929 ..                                | 25 | 44 | 4       | 46 | 0.65 | 21       | 24 | 12     | 7           | 0.65 | 16 | 27      | 0.65 | 16 | 27       | 0.65 | 16     | 27          | 0.65 | 16 | 27         | 0.65 | 16     | 27                       | 0.65 |        |                         |  |  |
| Means                                  | 27 | 23 | 18      | 47 | 1.65 | 29       | 55 | 25     | 29          | 1.81 | 26 | 36      | 2.20 | 26 | 36       | 2.20 | 26     | 36          | 2.20 | 26 | 36         | 2.20 | 26     | 36                       | 2.20 |        |                         |  |  |
| <i>Receipts—</i>                       |    |    | £ s. d. |    |      | £ s. d.  |    |        | £ s. d.     |      |    | £ s. d. |      |    | £ s. d.  |      |        | £ s. d.     |      |    | £ s. d.    |      |        | £ s. d.                  |      |        | £ s. d.                 |  |  |
| Wheat Crop ..                          |    |    | 6       | 3  | 3    | 6        | 14 | 8      | 6           | 14   | 8  | 6       | 14   | 8  | 6        | 14   | 8      | 6           | 14   | 8  | 6          | 14   | 8      | 6                        | 14   | 8      |                         |  |  |
| Barley Crop ..                         |    |    | 2       | 15 | 10   | 2        | 15 | 10     | 2           | 15   | 10 | 2       | 15   | 10 | 2        | 15   | 10     | 2           | 15   | 10 | 2          | 15   | 10     | 2                        | 15   | 10     |                         |  |  |
| Oat Crop .....                         |    |    | —       | —  | —    | —        | —  | —      | —           | —    | —  | —       | —    | —  | —        | —    | —      | —           | —    | —  | —          | —    | —      | —                        | —    | —      |                         |  |  |
| Grazing Crop ..                        |    |    | 0       | 19 | 1    | 0        | 19 | 1      | 0           | 19   | 1  | 0       | 19   | 1  | 0        | 19   | 1      | 0           | 19   | 1  | 0          | 19   | 1      | 0                        | 19   | 1      |                         |  |  |
| Stubble Grazing                        |    |    | 1       | 10 | 0    | 1        | 10 | 0      | 1           | 10   | 0  | 1       | 10   | 0  | 1        | 10   | 0      | 1           | 10   | 0  | 1          | 10   | 0      | 1                        | 10   | 0      |                         |  |  |
| Total Receipts                         |    |    | 11      | 8  | 2    | 11       | 8  | 2      | 11          | 8    | 2  | 11      | 8    | 2  | 11       | 8    | 2      | 11          | 8    | 2  | 11         | 8    | 2      | 11                       | 8    | 2      |                         |  |  |
| <i>Expenditure—</i>                    |    |    | £ s. d. |    |      | £ s. d.  |    |        | £ s. d.     |      |    | £ s. d. |      |    | £ s. d.  |      |        | £ s. d.     |      |    | £ s. d.    |      |        | £ s. d.                  |      |        | £ s. d.                 |  |  |
| Wheat Crop ..                          |    |    | 4       | 2  | 11   | 4        | 2  | 11     | 4           | 2    | 11 | 4       | 2    | 11 | 4        | 2    | 11     | 4           | 2    | 11 | 4          | 2    | 11     | 4                        | 2    | 11     |                         |  |  |
| Barley Crop ..                         |    |    | 2       | 9  | 5    | 2        | 9  | 5      | 2           | 9    | 5  | 2       | 9    | 5  | 2        | 9    | 5      | 2           | 9    | 5  | 2          | 9    | 5      | 2                        | 9    | 5      |                         |  |  |
| Oat Crop .....                         |    |    | —       | —  | —    | —        | —  | —      | —           | —    | —  | —       | —    | —  | —        | —    | —      | —           | —    | —  | —          | —    | —      | —                        | —    | —      |                         |  |  |
| Rye Grass .....                        |    |    | —       | —  | —    | —        | —  | —      | —           | —    | —  | —       | —    | —  | —        | —    | —      | —           | —    | —  | —          | —    | —      | —                        | —    | —      |                         |  |  |
| Rent (4 years)                         |    |    | 2       | 10 | 0    | 2        | 10 | 0      | 2           | 10   | 0  | 2       | 10   | 0  | 2        | 10   | 0      | 2           | 10   | 0  | 2          | 10   | 0      | 2                        | 10   | 0      |                         |  |  |
| Total Expenditure                      |    |    | 9       | 2  | 4    | 9        | 2  | 4      | 9           | 2    | 4  | 9       | 2    | 4  | 9        | 2    | 4      | 9           | 2    | 4  | 9          | 2    | 4      | 9                        | 2    | 4      |                         |  |  |
| Balance—Receipts over Expenditure..... |    |    | 2       | 5  | 10   | 2        | 5  | 10     | 2           | 5    | 10 | 2       | 5    | 10 | 2        | 5    | 10     | 2           | 5    | 10 | 2          | 5    | 10     | 2                        | 5    | 10     |                         |  |  |
| Profit per Acre per Annum ...          |    |    | 0       | 11 | 6    | 0        | 11 | 6      | 0           | 11   | 6  | 0       | 11   | 6  | 0        | 11   | 6      | 0           | 11   | 6  | 0          | 11   | 6      | 0                        | 11   | 6      |                         |  |  |

As in the case of the three-course rotation, the highest wheat yield has been secured from the rotation where oats is the secondary crop. Here the return is 29bush. 55lbs. per acre, as compared with 27bush. 23lbs. and 26bush. 36lbs., from the rotations including Barley and Rye grass respectively.

The barley yield is fairly satisfactory, being almost 19bush., and the average for oats is 25bush. 29lbs. The Italian Rye Grass has yielded very good grazing, the average carrying capacity being 2.20 sheep per acre in the first year and 2.82 in the second, making a mean annual return of 2.51 sheep.

The poorest grazing years were 1927 and 1929, when the return from the rye grass was only 0.64 sheep per acre per annum. On the other hand, 1920 and 1921 were good pasture seasons, and the rye grass grazing amounted to almost five sheep per acre. The mean figures for the natural grazing in the pasture year in the other systems are 1.65 and 1.81 sheep per acre.



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The money value of all produce has been calculated, and after allowance is made for the various items of expenditure, the Bare Fallow, Wheat, Oats, Pasture rotation shows a net profit of 15s. 11d. per acre, the Bare Fallow, Wheat, Rye Grass, Rye Grass 13s. 9d., and Bare Fallow, Wheat, Barley, Pasture 11s. 9d.

#### FIVE-COURSE ROTATION.

Only one five-course rotation is included in the plan of experiment. It consists of a single wheat crop, preceded by bare fallow, and followed by three years of lucerne pasturage. The lucerne seed is broadcasted at the rate of 6lbs. per acre in the wheat stubble, and lightly covered. The wheat crop is manured at the rate of 2cwts. superphosphate per acre, but the lucerne receives no additional fertiliser.

*Returns from Five-Course Rotation—Bare Fallow, Wheat, Lucerne, Lucerne, Lucerne, (1917-29).*

| Year.                                   | Wheat. |    | Lucerne Grazing.   |                     |                    |
|-----------------------------------------|--------|----|--------------------|---------------------|--------------------|
|                                         | B.     | L. | First Year. Sheep. | Second Year. Sheep. | Third Year. Sheep. |
| 1917 .....                              | 41     | 37 | 1.49               | —                   | —                  |
| 1918 .....                              | 33     | 30 | 1.05               | 1.54                | —                  |
| 1919 .....                              | 28     | 1  | 1.38               | 1.28                | 1.61               |
| 1920 .....                              | 36     | 40 | 3.09               | 4.63                | 5.80               |
| 1921 .....                              | 22     | 7  | 3.51               | 3.83                | 4.06               |
| 1922 .....                              | 31     | 48 | 2.09               | 2.61                | 3.15               |
| 1923 .....                              | 35     | 37 | 2.00               | 3.49                | 3.49               |
| 1924 .....                              | 36     | 14 | 3.22               | 4.13                | 3.34               |
| 1925 .....                              | 27     | 17 | 0.48               | 1.79                | 2.60               |
| 1926 .....                              | 23     | 6  | 1.51               | 1.50                | 2.58               |
| 1927 .....                              | 18     | 43 | 0.08               | 1.01                | 1.01               |
| 1928 .....                              | 22     | 1  | 1.75               | 1.03                | 1.03               |
| 1929 .....                              | 20     | 12 | 0.04               | 0.97                | 0.97               |
| Means .....                             | 28     | 59 | 1.67               | 2.32                | 2.69               |
| <i>Receipts—</i>                        |        |    | £ s. d.            |                     |                    |
| Wheat Crop .....                        |        |    | 6                  | 10                  | 5                  |
| Lucerne Grazing .....                   |        |    | 3                  | 17                  | 5                  |
| Stubble Grazing .....                   |        |    | 0                  | 15                  | 0                  |
| Total Receipts .....                    |        |    | 11                 | 2                   | 10                 |
| <i>Expenditure—</i>                     |        |    |                    |                     |                    |
| Wheat Crop .....                        |        |    | 4                  | 2                   | 11                 |
| Lucerne Crop .....                      |        |    | 0                  | 16                  | 6                  |
| Rent (five years) .....                 |        |    | 2                  | 12                  | 6                  |
| Total Expenditure .....                 |        |    | 7                  | 11                  | 11                 |
| Balance—Receipts over Expenditure ..... |        |    | 3                  | 10                  | 11                 |
| Profit per acre per annum .....         |        |    | 0                  | 14                  | 2                  |

The average wheat yield from this rotation is within a pound of 29bush.

The lucerne has provided first-class grazing, and in 1920 the third-year crop carried almost six sheep per acre. In this year the summer rainfall was fairly high, and even first-year lucerne yielded grazing for three sheep per acre per annum.

The quantity of fodder increases with the age of the crop, averaging 1.67 sheep per acre in its first year, 2.32 in the second, and 2.69 in the third. The annual grazing is therefore 2.23 sheep per acre.

The total receipts amount to £11 2s. 10d., and expenses, including rent, £7 11s. 11d.

The balance in favor of this rotation thus becomes £3 10s. 11d., or a profit per acre of 14s. 2d.



## SUMMARY OF ROTATIONS.

In order that the comparative values of the different rotations may be conveniently studied, the mean annual profits from each form of rotation have been summarised below:—

*Summary of Mean Annual Profits from Rotations Tested at Booborowie, 1917-29.*

| Rotation.     |                                                           | Annual Profit<br>per Acre. |            |
|---------------|-----------------------------------------------------------|----------------------------|------------|
|               |                                                           | £                          | s. d.      |
| Single Crop . | Permanent grazing .....                                   | 0                          | 9 11       |
| Two Course .  | Bare Fallow, Wheat .....                                  | 0                          | 14 1       |
| " " ..        | Summer Crop—Wheat .....                                   | 0                          | 3 4 (loss) |
| Three Course. | Bare Fallow, Wheat (No Manure), Pasture ..                | 0                          | 3 5        |
| " " .         | Bare Fallow, Wheat ( $\frac{1}{2}$ wt. Super), Pasture .. | 1                          | 2 3        |
| " " .         | Bare Fallow, Wheat (1wt. Super), Pasture ..               | 1                          | 2 8        |
| " " .         | Bare Fallow, Wheat (2cwts. Super), Pasture ..             | 1                          | 1 2        |
| " " .         | Bare Fallow, Wheat (3cwts. Super), Pasture ..             | 0                          | 18 7       |
| " " .         | Bare Fallow, Wheat, Barley .....                          | 0                          | 15 4       |
| " " .         | Bare Fallow, Wheat, Oats .....                            | 1                          | 5 0        |
| " " .         | Bare Fallow, Wheat, Pease .....                           | 0                          | 2 10       |
| " " .         | Bare Fallow, Wheat, Rape .....                            | 0                          | 4 2        |
| Four Course . | Bare Fallow, Wheat, Barley, Pasture .....                 | 0                          | 11 6       |
| " " ..        | Bare Fallow, Wheat, Oats, Pasture .....                   | 0                          | 15 11      |
| " " ..        | Bare Fallow, Wheat, Rye Grass, Rye Grass .                | 0                          | 13 9       |
| Five Course.. | Bare Fallow, Wheat, Lucerne, Lucerne, Lucerne             | 0                          | 14 2       |

The three-course rotation Bare Fallow, Wheat, Oats has given the largest annual profit, namely, £1 5s. per acre. This is a form of cropping commonly availed of in the Booborowie district, and from the figures quoted appears to be a practice which is well justified.

Another three-course rotation—Bare Fallow, Wheat, Pasture—has shown the very satisfactory profit of £1 2s. 8d. per acre.

In addition, the rotations Bare Fallow, Wheat, Oats, Pasture; Bare Fallow, Wheat, Barley; and Bare Fallow, Wheat, Lucerne, Lucerne, have each given a greater mean profit than Bare Fallow, Wheat, which is accepted as the basis for comparison of rotational experiments.

Where expense is incurred in sowing a grazing crop such as Sudan grass, Pease, or Rape the profits have been materially reduced.

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## SPRAYING EXPERIMENTS FOR THE CONTROL OF GREEN PEACH APHIS (*Myzus persicae*) CARRIED OUT AT THE BLACKWOOD EXPERIMENTAL ORCHARD, 1929.

[By R. FOWLER, Manager, Adelaide and Coromandel Valley Experimental Orchards.]

This aphid first made its appearance in large numbers in the Experimental Orchard in 1924, and that year did a very considerable amount of damage in practically all the peach orchards in this and other States. In 1925, a number of winter spraying tests were made, but as, in the following Spring, the infestation was a very light one, no very pronounced results were obtained, and in the Winter, owing to pressure of other work, and a false sense of security from attack, the winter sprays were not continued. This was rather unfortunate, as it happened, because in 1929 another epidemic occurred, which almost threatened to wipe out the peach trees themselves, and caused untold loss to peach growers in South Australia, Victoria, and New South Wales. In the winter of 1929 spraying tests were again taken up, and new preparations tried.

Before dealing with the results, a few words about the life history of the insect will perhaps help us to understand more fully why a spray applied in the Winter has some chance of success.

Considerable interest attaches to the green aphid species, as it furnishes a striking example of the summer migration of aphids to different food plants. This species, during the Summer, feeds upon various vegetables and plants. We are told by Entomologists, who have studied its life history, that the Winter is usually passed in the egg stage on the peach, though the wingless females may sometimes persist on the summer food plants, if weather conditions are not too severe. The eggs hatch very early in the Spring, so that the young stem mothers from them are often almost fully grown before the earliest peach blossom appears. About the time the buds begin to open the stem mothers begin to give birth to living young. Very few of this brood attain wings, but the third generation mostly become winged and begin to leave the peach trees on which they were born, about November, and by early December have almost completely left the peaches and gone to their Summer food plants.

\* According to observations made by E. P. Taylor, in America the Spring generations of the peach become fully grown in about two weeks, and an individual aphid lives about a month. The winged females were observed to return to the peaches at Blackwood in the very late autumn, when most of the leaves were falling.

Numerous specimens were under observation, both last Autumn and this, and each was noticed to have a small colony of young, from eight to 10, which grew in size very rapidly. These developed into wingless females. The true males to fertilise these females are winged and migrate from the Summer plants, we are told. It is from these females that we get the Winter eggs which, as before stated, give rise to the stem mothers which start the Spring generation.

With this definite information regarding the life history of green aphid, we know that the eggs are on the trees during the Winter, and probably can be reached with a Winter spray to destroy them, and that before the buds actually burst, and when strong sprays may still be used. The wingless female that gives rise to all the subsequent broods is also exposed to attack, and, therefore, when applying sprays at this time, we are attacking the insects with the most chance of effectively checking them. We all know the difficulty of doing this once the colonies are established in the newly-formed leaves.

The tests at Blackwood were designed with the idea of proving if a Winter spray would materially assist in peach aphid control, and which of a number of suggested



washes would give the best results. The tests were nine in number. Each test consisted of two rows of peaches, each containing 20 trees of various varieties, 28 of which were sprayed, and 12 were left as check trees.

The sprays used were (1) Volek Oil, 2 per cent. Solution; (2) Kleenup, 4 per cent. Solution (this is a winter spray oil prepared by Volek); (3) Gargoyle Special Spraying Oil, 1 in 25; (4) Gargoyle Red Spraying Oil, 1 in 25; (5) French's Formula (1gall. oil, 1 pint Black Leaf 40, 1lb. soft soap to 100galls. of water); (6) 1 pint Black Leaf 40, 4lbs. soft soap to 100galls. of water; (7) Lime Sulphur, 1 in 12; (8) Rustica Salis (an Italian preparation); (9) Atomol Tobacco Dust, 3 per cent.

The sprays were all applied on August 6th, 1929, when most of the flower buds were just commencing to swell. Two or three of the early flowering varieties were out in full bloom, and suffered rather severely from the oil sprays. The dusting was done on September 11th when the buds were more fully expanded.

As the experiments were carried out in part of the variety collection, it was obviously impossible to get any definite crop record, but notes were made from observations from time to time. Green aphid appeared in the Spring in fair numbers, but nothing like the infestation of the previous year.

In Tests 1, 2, 3, and 4 where oil sprays were used, the results were very satisfactory, very little green aphid being noticeable, while some of the unsprayed check trees were rather badly infested. There was also an appreciable difference in the appearance of the foliage on the oil-sprayed trees, the leaves being larger, healthier, and of a darker green color than on the check trees. French's Formula in Test 5 displayed good control of the aphid, but did not affect the appearance of the trees as in Tests 1-4. In Test 6 Black Leaf 40 and soap, the sprayed trees showed few aphids, although some of the check trees were infested. The foliage did not appear to be affected. Considerable trouble was experienced with this mixture in the spray pump. The valves stuck continually, with resultant loss of pressure. Lime Sulphur 1 in 12 in Test 7, apparently was not as effective as the oils or the Black Leaf 40, and there was no noticeable difference in the appearance of the trees.

Rustica Salis in Test 8 gave no outstanding results. Atomol Dust in Test 9 gave rather poor results from Winter use only, more green aphid being noticeable in the rows treated than in any other of the Tests, with little apparent difference between the treated and the check trees. We know from previous trials that better results are obtained with this Dust later, when the insects are more numerous on the trees.

During the coming season two new winter washes imported from England are to be tried, No. 1 being Wm. Cooper & Nephews Limited Tar Distilled Wash, and No. 2 a similar preparation called "Mortegg," put up by Murphy & Son. These washes are reported to have given good results in England, New South Wales, and New Zealand against various pests.

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## DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA.

[PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.]

| Herd Book No.                                     | Name of Cow.                          | Owner.                                 | Breed.   | Calved. | Age at Calving. | Total Milk. |         |      | Average Test. | Total Butterfat. | Days Tested. | Remarks. |
|---------------------------------------------------|---------------------------------------|----------------------------------------|----------|---------|-----------------|-------------|---------|------|---------------|------------------|--------------|----------|
|                                                   |                                       |                                        |          |         |                 | Lbs.        | %       | Lbs. |               |                  |              |          |
| JUNIOR TWO-YEAR-OLDS.—BUTTERFAT STANDARD, 200LBS. |                                       |                                        |          |         |                 |             |         |      |               |                  |              |          |
| 3096                                              | Glen Murray Netherland Freda.....     | T. J. H. Dodd, Mypononga .....         | Friesian | 10/6/29 | 2               | 59          | 12,997½ | 3.26 | 423.19        | 273              | —            |          |
| Not allotted                                      | Murray Glen Inks Topsy .....          | C. J. Morris, Monteth .....            | "        | 18/8/29 | 2               | 76          | 15,660  | 3.29 | 514.45        | 365              | —            |          |
| 23632                                             | Glenowie Griseida Pontiac .....       | H. M. Montephen, Monteth .....         | "        | 30/3/29 | 2               | 93          | 11,142  | 3.56 | 396.15        | 273              | —            |          |
| 15422                                             | Pella Lady Lotus .....                | A. E. Sieber, Eudunda .....            | Jersey   | 11/6/29 | 2               | 50          | 10,107  | 3.52 | 355.30        | 273              | —            |          |
| 14387                                             | Kyby Heather .....                    | Government Farm, Kybybolite .....      | Ayrshire | 20/7/29 | 2               | 15          | 4,977   | 6.89 | 342.74        | 273              | —            |          |
| Not allotted                                      | Kyby Ina .....                        | Government Farm, Kybybolite .....      | "        | 16/5/29 | 2               | 135         | 8,305½  | 4.06 | 337.49        | 273              | —            |          |
| Not allotted                                      | Alama Netherland Countess .....       | W. Hawker, Clare .....                 | Friesian | 15/9/29 | 2               | 11          | 10,581  | 4.38 | 334.18        | 273              | —            |          |
| 23553                                             | Dalebank Carnation 4th .....          | J. M. Bray, Langborne's Creek .....    | Jersey   | 25/5/29 | 2               | 118         | 5,565   | 3.06 | 323.36        | 273              | —            |          |
| Not allotted                                      | Olive 3rd of Klama .....              | E. & A. Nicholls, Woodville .....      | I.M.S.   | 9/8/29  | 2               | 58th        | 8,925   | 5.65 | 314.99        | 273              | —            |          |
| "                                                 | Kernden Lady Twyllah .....            | E. O. Traeger, Eudunda .....           | Jersey   | 10/6/29 | 1               | 210         | 5,437½  | 3.51 | 313.00        | 273              | —            |          |
| 18428                                             | Burnie Gloria .....                   | J. M. Hudd, Bletchley .....            | "        | 31/7/29 | 2               | 91          | 5,626½  | 5.70 | 309.72        | 273              | —            |          |
| Not allotted                                      | Kyby Roseleaf .....                   | Government Farm, Kybybolite .....      | Ayrshire | 22/7/29 | 2               | 68          | 7,606½  | 5.82 | 298.55        | 273              | —            |          |
| Not allotted                                      | Glenowie Griseida's Della .....       | H. Mountstephen, Monteth .....         | Friesian | 10/4/29 | 2               | 36          | 8,593½  | 3.92 | 297.99        | 273              | —            |          |
| "                                                 | Yongala Primula .....                 | J. A. Bradtke, Yongala .....           | Jersey   | 5/6/29  | 1               | 222         | 5,307   | 3.37 | 290.01        | 273              | —            |          |
| 24698                                             | Scrubview Daffodil .....              | A. B. A. Weckert, Brinkworth .....     | "        | 2/4/29  | 1               | 216         | 5,055   | 5.42 | 287.83        | 273              | —            |          |
| Not allotted                                      | Dalebank Snowflake 2nd .....          | R. J. Hague, Clare .....               | "        | 11/4/29 | 2               | 39          | 5,661   | 4.77 | 273.75        | 273              | —            |          |
| "                                                 | Waratah's Sunshade of the Bluff ..... | H. B. Kuchel, Murray Bridge .....      | M.S.     | 1/4/29  | 2               | 47          | 6,043½  | 4.42 | 270.01        | 273              | —            |          |
| 2556                                              | Barina Rosemary Poeh .....            | L. H. and P. C. Giles, Auburn .....    | Friesian | 12/5/29 | 1               | 352         | 8,526   | 3.10 | 264.47        | 273              | —            |          |
| 23592                                             | Kangaroo Flat Cymbal .....            | J. T. Oates, Kangaroo Flat .....       | Jersey   | 1/7/29  | 2               | 37          | 4,380½  | 6.06 | 262.91        | 273              | —            |          |
| 18419                                             | Kyby Alrie .....                      | Government Farm, Kybybolite .....      | Ayrshire | 2/8/29  | 2               | 163         | 5,638½  | 4.90 | 259.13        | 273              | —            |          |
| 23617                                             | Roseworthy Dawn .....                 | Agricultural College, Roseworthy ..... | "        | 6/7/29  | 2               | 124         | 4,242   | 8.11 | 258.80        | 273              | —            |          |
| 2654                                              | Barina Poeh's Easter Dawn .....       | L. H. and P. C. Giles, Auburn .....    | Friesian | 19/8/29 | 2               | 42          | 8,658   | 6.10 | 255.95        | 273              | —            |          |
| 23595                                             | Kangaroo Flat Queen Bird .....        | J. T. Oates, Kangaroo Flat .....       | Jersey   | 27/9/29 | 2               | 11          | 4,170   | 5.94 | 247.77        | 240              | Dried off    |          |
| Not allotted                                      | Cloud of Toora .....                  | H. B. Kuchel, Murray Bridge .....      | M.S.     | 1/9/29  | 2               | 41          | 6,903   | 3.56 | 247.77        | 240              | Dried off    |          |
| "                                                 | Glenowie Plus Griseida .....          | H. Mountstephen, Monteth .....         | Friesian | 29/7/29 | 2               | 99          | 6,775½  | 3.62 | 245.40        | 273              | —            |          |
| 23594                                             | Kangaroo Flat Lasse .....             | J. T. Oates, Kangaroo Flat .....       | Jersey   | 7/7/29  | 2               | 325         | 4,239   | 6.76 | 244.35        | 273              | —            |          |
| Not allotted                                      | Hampden Dorothy .....                 | A. E. Middleton, Balaklava .....       | "        | 31/7/29 | 1               | 159         | 4,218   | 5.75 | 242.58        | 273              | —            |          |
| 2651                                              | Barina Daffodil Poeh .....            | L. H. and P. C. Giles, Auburn .....    | Friesian | 18/4/29 | 2               | 1           | 8,127   | 3.21 | 242.40        | 273              | —            |          |
| Not allotted                                      | Morella Belle 3rd .....               | H. R. Walsh, Salisbury .....           | Jersey   | 17/8/29 | 2               | 47          | 4,243½  | 6.41 | 229.06        | 273              | —            |          |
| "                                                 | Oakhill Carnation 4th .....           | Mrs. B. G. Neumann, Hampden .....      | "        | 27/8/29 | 2               | 83          | 4,152   | 5.34 | 220.90        | 273              | —            |          |
| "                                                 | Jewel of Toora .....                  | H. B. Kuchel, Murray Bridge .....      | M.S.     | 1/9/29  | 2               | 11          | 5,170½  | 4.23 | 218.74        | 273              | —            |          |
| Not allotted                                      | Pella Solanum's Starbright .....      | W. P. Eckermann, Eudunda .....         | Jersey   | 12/4/29 | 1               | 192         | 4,627½  | 4.64 | 214.94        | 273              | —            |          |
| "                                                 | Pella Sweet Lotus .....               | W. P. Eckermann, Eudunda .....         | "        | 16/5/29 | 1               | 134         | 4,102½  | 5.20 | 213.35        | 273              | —            |          |
| 23601                                             | Hampden's King Carnation .....        | J. A. J. Pfister, Hampden .....        | "        | 12/5/29 | 1               | 244         | 3,584   | 5.89 | 211.55        | 273              | —            |          |



PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.—continued.

| Herd Book No.                                                | Name of Cow.                     | Owner.                             | Breed.   | Calved.  | Age at Calving. | Total Milk. | Yrs. Days. |      | Total Butterfat. | Days Tested. | Remarks.                      |
|--------------------------------------------------------------|----------------------------------|------------------------------------|----------|----------|-----------------|-------------|------------|------|------------------|--------------|-------------------------------|
|                                                              |                                  |                                    |          |          |                 |             | %          | Lbs. |                  |              |                               |
| JUNIOR TWO-YEAR-OLDS—BUTTERFAT, STANDARD, 200LBS.—continued. |                                  |                                    |          |          |                 |             |            |      |                  |              |                               |
| Not allotted                                                 | Para Werra Sunrise               | J. H. Dawkins, Gawler              | Jersey   | 8/7/29   | 1 271           | 3,541½      | 5.04       |      | 210-23           | 273          | —                             |
| 10949                                                        | Ontario Kate's Twylah            | T. B. Brooks, Clarendon            | "        | 29/8/29  | 2 25            | 3,840       | 5.32       |      | 204-15           | 240          | Dried off                     |
| Not allotted                                                 | Shadstone 3rd of East View       | H. H. Shillabeer, Kilkenny         | I.M.S.   | 9/5/29   | 2 149           | 5,397       | 5.44       |      | 185-88           | 273          | —                             |
| Not allotted                                                 | Pembroke Moss                    | C. W. Ansell, Bletchley            | Jersey   | 1/4/29   | 1 155           | 3,085½      | 5.71       |      | 176-07           | 273          | —                             |
| "                                                            | Scrubview Scarlet.               | A. B. A. Wecker, Brinkworth        | "        | 10/5/29  | 1 254           | 3,055½      | 5.34       |      | 163-09           | 273          | —                             |
| "                                                            | Jane of Oakhill                  | Mrs. B. G. Neumann, Hampden        | "        | 8/4/29   | 1 188           | 2,694       | 5.91       |      | 159-25           | 273          | —                             |
| "                                                            | Scrubview Damsel                 | A. B. A. Wecker, Brinkworth        | "        | 13/4/29  | 1 229           | 3,133½      | 4.86       |      | 152-20           | 273          | —                             |
| 23693                                                        | Camella 2nd of Glen Louisa       | M. Cowan, Murray Bridge            | M.S.     | 23/9/29  | 1 197           | 3,960       | 3.82       |      | 151-38           | 273          | Owner with-drawn from testing |
| "                                                            | Kangaroo Flat Heroline 2nd       | J. T. Oates, Kangaroo Flat         | Jersey   | 9/12/29  | 2 156           | 3,015       | 4.89       |      | 147-45           | 180          | —                             |
| Not allotted                                                 | Pheasant of East View            | H. H. Shillabeer, Kilkenny         | I.M.S.   | 30/10/29 | 2 39            | 3,675       | 3.92       |      | 143-93           | 180          | Sold                          |
| 16480                                                        | Kyby Viola                       | Government Farm, Kybybolite        | Ayrshire | 8/9/29   | 2 29            | 3,120       | 4.52       |      | 141-01           | 240          | Dried off                     |
| Not allotted                                                 | Phyllis of East View             | H. H. Shillabeer, Kilkenny         | I.M.S.   | 16/12/29 | 2 48            | 2,670       | 4.21       |      | 112-30           | 120          | Sold                          |
| Not allotted                                                 | Lime-light's Janet of Northfield | Insp.-Gen. Hospitals, Bedford Park | M.S.     | 1/12/29  | 2 32            | 2,160       | 3.97       |      | 85-83            | 90           | Slipped calf                  |
| 15032                                                        | Flirt of Northfield              | Insp.-Gen. Hospitals, Bedford Park | "        | 15/3/29  | 2 119           | 1,260       | 3.97       |      | 49-98            | 90           | Dried off                     |
| SENIOR TWO-YEAR-OLDS.                                        |                                  |                                    |          |          |                 |             |            |      |                  |              |                               |
| 20759                                                        | Bonny Lotus of Pella             | A. B. Sieber, Eudunda              | Jersey   | 1/4/29   | 2 384           | 8,890½      | 5.46       |      | 485-54           | 273          | —                             |
| 23605                                                        | Hampden Rhonda                   | C. C. T. Ottens, Brinkworth        | "        | 29/4/29  | 2 329           | 7,537½      | 5.42       |      | 408-53           | 273          | —                             |
| 20760                                                        | Doreen of Pella                  | A. B. Sieber, Eudunda              | "        | 26/4/29  | 2 306           | 7,747½      | 5.04       |      | 390-74           | 273          | —                             |
| Not allotted                                                 | Charabelle 4th of Wangara        | S. N. Bott, Murray Bridge          | M.S.     | 17/5/29  | 2 202           | 8,464½      | 4.16       |      | 352-50           | 273          | —                             |
| Not allotted                                                 | Glenowide Sylvia Patch           | H. Mountstephen, Monteth           | Friesian | 7/8/29   | 2 9mths         | 8,573½      | 3.95       |      | 338-57           | 273          | —                             |
| 20823                                                        | Princess of Kangaroo Flat        | J. T. Oates, Kangaroo Flat         | Jersey   | 7/5/29   | 2 304           | 6,298½      | 5.29       |      | 333-07           | 273          | —                             |
| 23622                                                        | Roseworthy Princess 26th         | Agricultural College, Roseworthy   | "        | 26/5/29  | 2 188           | 5,650½      | 5.89       |      | 332-85           | 273          | —                             |
| Not allotted                                                 | Princess 3rd of Ben Lomond       | Insp.-Gen. Hospitals, Northfield   | M.S.     | 22/5/29  | 2 284           | 7,084½      | 4.61       |      | 326-81           | 273          | —                             |
| Not allotted                                                 | Roseworthy Princess 25th         | Agricultural College, Roseworthy   | Jersey   | 25/7/29  | 2 272           | 6,114       | 5.28       |      | 322-88           | 273          | —                             |
| 23621                                                        | Para Werra Lady Ida              | J. H. Dawkins, Gawler              | "        | 10/7/29  | 2 332           | 4,995       | 6.41       |      | 320-42           | 240          | Dried off                     |
| 24664                                                        | Para Werra Cherry                | J. H. Dawkins, Gawler              | "        | 7/6/29   | 2 299           | 5,355       | 5.80       |      | 310-82           | 240          | Dried off                     |
| 23609                                                        | Hampden Thora's Twylah           | A. W. Middleton, Balaklava         | "        | 19/7/29  | 2 294           | 5,346       | 5.71       |      | 305-39           | 273          | —                             |
| 24694                                                        | Pembroke Sylvia                  | C. W. Ansell, Bletchley            | "        | 8/9/29   | 2 291           | 4,758       | 6.14       |      | 292-28           | 273          | —                             |
| 24693                                                        | Pembroke Lotus                   | C. W. Ansell, Bletchley            | "        | 6/9/29   | 2 304           | 5,773½      | 4.87       |      | 280-95           | 273          | —                             |
| Not allotted                                                 | Pembroke's Bonus of Kinnua       | E. & A. Nicholls, Woodville        | I.M.S.   | 25/8/29  | 2 219           | 7,986       | 3.40       |      | 271-92           | 273          | —                             |
| Not allotted                                                 | St. Heller's Barbara             | J. Dodd, Meningie                  | Jersey   | 22/7/29  | 2 301           | 5,290       | 5.14       |      | 271-28           | 180          | Withdrawn                     |
| 19231                                                        | West Kilbride Favorite           | H. D. Secomb & Son, Two Wells      | Ayrshire | 2/7/29   | 2 312           | 5,598       | 4.84       |      | 270-74           | 273          | Withdrawn                     |
| Not allotted                                                 | St. Heller's Mystery             | J. Dodd, Meningie                  | Jersey   | 6/9/29   | 2 296           | 4,800       | 5.54       |      | 266-01           | 150          | —                             |
| Not allotted                                                 | Delebank Pretty May              | Agric. College, Roseworthy         | "        | 19/5/29  | 2 252           | 5,221½      | 5.09       |      | 265-94           | 273          | —                             |
| 23687                                                        | Eudunda Lady Combination.        | W. S. McAuliffe, Eudunda           | "        | 25/7/29  | 2 309           | 4,317       | 5.97       |      | 257-66           | 273          | —                             |



F PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.—continued.

| Head Book No.                              | Name of Cow.                | Owner.                                     | Breed.   | Calved.  | Age at Calving. | Total MILK. | Lbs. | %    | Average Test. | Total Butter-fat. | Days Tested.                         | Remarks. |
|--------------------------------------------|-----------------------------|--------------------------------------------|----------|----------|-----------------|-------------|------|------|---------------|-------------------|--------------------------------------|----------|
| SENIOR TWO-YEAR-OLDS—continued.            |                             |                                            |          |          |                 |             |      |      |               |                   |                                      |          |
| Not allotted                               | Ferriden Lady Beth          | E. O. Traeger, Eudunda                     | Jersey   | 5/9/29   | 2 210           | 4,627½      | 5-48 | 5-48 | 253-71        | 273               | —                                    |          |
| 16398                                      | Glenowie Echo Patch         | H. Mountstephen, Monteth                   | Friesian | -/5/29   | 2 7mth          | 6,802½      | 3-66 | 3-66 | 248-08        | 273               | —                                    |          |
| 23598                                      | Kyby Isis                   | Government Farm, Kybybolite                | Ayrshire | 30/3/29  | 2 262           | 6,316½      | 3-61 | 3-61 | 227-78        | 273               | —                                    |          |
| 18421                                      | Delma Queen                 | E. W. Partner, Eudunda                     | Jersey   | 3/9/29   | 2 186           | 3,931½      | 5-74 | 5-74 | 225-83        | 273               | —                                    |          |
| 23630                                      | Kyby Bonny Lass             | Government Farm, Kybybolite                | Ayrshire | 16/9/29  | 2 264           | 5,500½      | 3-93 | 3-93 | 219-92        | 273               | —                                    |          |
| 10947                                      | Werrina Jessica             | J. A. J. Fitzner, Hampden                  | Jersey   | 15/6/29  | 2 336           | 3,645       | 6-02 | 6-02 | 219-59        | 190               | Sold                                 |          |
| 20815                                      | Poxy of East View           | H. H. Shillabeer, Kilkenny                 | I.M.S.   | 13/9/29  | 2 343           | 3,635       | 3-48 | 3-48 | 213-90        | 240               | Sold                                 |          |
| Not allotted                               | Grey Bramble of Eden Park   | J. T. Oats, Kangaroo Flat                  | Jersey   | 15/7/29  | 2 343           | 3,433½      | 6-07 | 6-07 | 208-57        | 273               | —                                    |          |
| Not allotted                               | Buttercup 1st of Ben Lomond | Inspector-General of Hospitals, Northfield | M.S.     | 16/6/29  | 2 339           | 4,932½      | 4-21 | 4-21 | 207-64        | 273               | —                                    |          |
| 16386                                      | Kyby Countess 4th           | Government Farm, Kybybolite                | Ayrshire | 14/6/29  | 2 207           | 3,645       | 4-42 | 4-42 | 161-21        | 240               | Dried off                            |          |
| Not allotted                               | Pembroke Neta               | C. W. Ansell, Bleitchley                   | Jersey   | 20/10/29 | 2 320           | 2,850       | 5-23 | 5-23 | 149-03        | 150               | Dried off                            |          |
| 10948                                      | Lula The Second of Eastview | H. H. Shillabeer, Kilkenny                 | I.M.S.   | 21/11/29 | 2 338           | 2,480       | 3-90 | 3-90 | 92-45         | 120               | Dead                                 |          |
| 23596                                      | Dalebank Rhododora 5th      | J. T. Oats, Kangaroo Flat                  | Jersey   | 30/1/30  | 2 358           | 1,830       | 4-86 | 4-86 | 88-85         | 120               | Owner with-<br>drawn from<br>testing |          |
| 10950                                      | Virginia of Eastview        | H. H. Shillabeer, Kilkenny                 | I.M.S.   | 1/2/30   | 2 355           | 2,490       | 3-17 | 3-17 | 79-01         | 90                | Sold                                 |          |
| JUNIOR THREE YEAR OLDS.—STANDARD, 250 LBS. |                             |                                            |          |          |                 |             |      |      |               |                   |                                      |          |
| 2503                                       | Murry Glen Segis Inka       | C. J. Morris, Monteth                      | Friesian | 27/7/29  | 3 66            | 11,556      | 3-92 | 3-92 | 452-99        | 273               | —                                    |          |
| Not allotted                               | Hampden Maybee              | J. A. J. Fitzner, Hampden                  | Jersey   | 25/6/29  | 3 6             | 7,771½      | 5-81 | 5-81 | 451-43        | 273               | —                                    |          |
| 20850                                      | Winnie of Hampden           | " "                                        | "        | 30/5/29  | 3 91            | 6,109½      | 6-70 | 6-70 | 409-55        | 273               | —                                    |          |
| 20827                                      | Carnation of Hampden        | " "                                        | "        | 13/8/29  | 3 122           | 7,006½      | 5-84 | 5-84 | 409-00        | 273               | —                                    |          |
| 20764                                      | Leda Grey of Pella          | W. P. Eckermann, Eudunda                   | Jersey   | 11/7/29  | 3 75            | 6,348       | 6-09 | 6-09 | 386-43        | 273               | —                                    |          |
| Not allotted                               | Flower of Toora             | S. N. Bott, Murray Bridge                  | M.S.     | 24/6/29  | 3 129           | 87,94½      | 4-23 | 4-23 | 372-01        | 273               | —                                    |          |
| 20822                                      | Hermine of Kangaroo Flat    | J. T. Oats, Kangaroo Flat                  | Jersey   | 2/8/29   | 3 31            | 5,712       | 6-11 | 6-11 | 349-25        | 273               | —                                    |          |
| 24692                                      | Pembroke Duchess            | C. W. Ansell, Bleitchley                   | "        | 16/9/29  | 3 68            | 6,273       | 5-39 | 5-39 | 337-93        | 273               | —                                    |          |
| Not allotted                               | Bess 2nd of Kiana           | E. & A. Nicholls, Woodville                | I.M.S.   | 4/9/29   | 3 152           | 8,377½      | 3-90 | 3-90 | 326-51        | 273               | —                                    |          |
| 20772                                      | Burnlea Bloom               | J. M. Hudd, Bleitchley                     | Jersey   | 28/8/29  | 3 49            | 5,856       | 5-36 | 5-36 | 313-96        | 273               | —                                    |          |
| 10940                                      | Gold of Eastview            | H. H. Shillabeer, West Croydon             | I.M.S.   | 20/6/29  | 3 50            | 8,856       | 3-95 | 3-95 | 290-94        | 273               | —                                    |          |
| 10938                                      | Fortune 3rd of Eastview     | H. H. Shillabeer, West Croydon             | I.M.S.   | 17/4/29  | 3 57            | 7,312½      | 3-95 | 3-95 | 289-02        | 273               | —                                    |          |
| 20746                                      | Viola 3rd of Dalebank       | H. R. Walsh, Salisbury                     | Jersey   | 10/4/29  | 3 89            | 5,068½      | 5-70 | 5-70 | 288-81        | 273               | —                                    |          |
| Not allotted                               | Myrtle Bank Buttermilk      | W. A. Rodda, Salisbury                     | "        | 11/5/29  | 3 97            | 4,456½      | 5-96 | 5-96 | 265-53        | 273               | —                                    |          |
| 20852                                      | May Day of Darlington       | E. J. Haque, Clare                         | "        | 20/9/29  | 3 142           | 4,988       | 5-27 | 5-27 | 240-28        | 273               | —                                    |          |
| 20778                                      | Burnlea Eileen              | J. M. Hudd, Bleitchley                     | "        | 18/9/29  | 3 81            | 4,770       | 5-52 | 5-52 | 253-85        | 240               | Dried off                            |          |
| 20729                                      | Kato IV. of Stonyfield      | H. & A. Bohme, Ballanah                    | "        | 29/5/29  | 3 23            | 4,47½       | 5-58 | 5-58 | 248-20        | 273               | —                                    |          |
| 16395                                      | Kyby Snowflake              | Government Farm, Kybybolite                | Ayrshire | 20/4/29  | 3 43            | 5,490       | 4-18 | 4-18 | 224-74        | 240               | Dried off                            |          |
| 16394                                      | Kyby Snowflake              | Government Farm, Kybybolite                | "        | 30/3/29  | 3 19            | 5,490       | 4-09 | 4-09 | 224-69        | 273               | —                                    |          |
| 16393                                      | Kyby Rosebud                | Government Farm, Kybybolite                | "        | 11/8/29  | 3 115           | 6,270       | 3-49 | 3-49 | 218-99        | 240               | Dried off                            |          |
| Not allotted                               | Tot the 1st of Ben Lomond   | Insp.-Gen. of Hospitals, Northfield        | M.S.     | 4/9/29   | 3 16            | 3,780       | 4-11 | 4-11 | 155-45        | 210               | Dried off                            |          |



PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.—continued.

| Herd Book No.                                        | Name of Cow.                   | Owner.                             | Breed.   | Calved.  | Age at Calving. | Total MILK. | Aver. age Test. | Total Butter-fat. | Days Tested. | Remarks.  |
|------------------------------------------------------|--------------------------------|------------------------------------|----------|----------|-----------------|-------------|-----------------|-------------------|--------------|-----------|
| JUNIOR THREE-YEAR-OLDS—STANDARD, 250 LBS.—continued. |                                |                                    |          |          |                 |             |                 |                   |              |           |
| 16389                                                | Kyby Juliet                    | Government Farm, Kybybolite        | Ayrshire | 12/2/30  | 3 96            | 2,490       | 4.07            | 101.41            | 90           | Sold      |
| Not allotted                                         | Glen Robin Adeline 2nd         | J. O. Robinson, Meadows            | "        | 23/11/29 | 3 80            | 2,595       | 3.83            | 99.31             | 120          | Dried off |
| 18709                                                | Oakbank Beauful                | J. O. Robinson, Meadows            | "        | 29/1/30  | 3 111           | 960         | 4.00            | 38.43             | 60           | Dried off |
| SENIOR THREE-YEAR-OLDS—STANDARD, 275 LBS.            |                                |                                    |          |          |                 |             |                 |                   |              |           |
| 20835                                                | St. Helier's Diana             | J. Dodd, Meningie                  | Jersey   | 15/8/29  | 3 256           | 6,390½      | 6.21            | 398.89            | 273          | —         |
| 23566                                                | Para Wirra Duide               | J. H. Dawkins, Gawler              | "        | 16/8/29  | 3 341           | 6,984       | 5.48            | 382.91            | 273          | —         |
| 20851                                                | Werrina Jessie                 | J. A. J. Pitzner, Hampden          | "        | 5/6/29   | 3 280           | 6,006       | 6.34            | 389.85            | 273          | —         |
| 20847                                                | Roseworthy Flora               | Agricultural College, Roseworthy   | "        | 6/8/29   | 3 300           | 5,617       | 6.42            | 369.70            | 273          | —         |
| 20771                                                | Burnlea Blanche                | J. M. Hudd, Bletchley              | "        | 26/8/29  | 3 327           | 6,510       | 5.25            | 341.55            | 273          | —         |
| 23642                                                | Wollagurry Hero's Tulip        | H. R. Walsh, Salisbury             | "        | 9/9/29   | 3 364           | 5,109       | 6.63            | 338.81            | 273          | —         |
| Not allotted                                         | Mayflower II. of Klama         | E. & A. Nicholls, Woodville        | I.M.S.   | 19/5/29  | 3 232           | 8,184       | 4.06            | 314.51            | 273          | —         |
| 23554                                                | Myrtle Bank Kate               | T. B. Brooks, Clarendon            | Jersey   | 25/7/29  | 3 308           | 5,310       | 5.87            | 310.99            | 240          | Dried off |
| 23619                                                | Roseworthy Lady II.            | Agricultural College, Roseworthy   | "        | 23/5/29  | 3 271           | 5,076       | 5.69            | 289.05            | 273          | —         |
| 15008                                                | Lester's Pearl of Toora        | H. B. Kuchel, Murray Bridge        | M.S.     | 12/9/29  | 3 232           | 6,556½      | 4.19            | 274.96            | 273          | —         |
| 14710                                                | Kyby Minna                     | Government Farm, Kybybolite        | Ayrshire | 16/5/29  | 3 235           | 5,534½      | 4.89            | 271.70            | 273          | —         |
| Not allotted                                         | Sundowner of Ben Lomond        | Insp.-Gen. Hospital, Bedford Park. | M.S.     | 20/6/29  | 3 307           | 5,955       | 4.31            | 256.75            | 240          | Dried off |
| 23637                                                | Kelvinside Princess            | H. R. Walsh, Salisbury             | Jersey   | 16/8/29  | 3 304           | 3,744       | 5.92            | 221.48            | 273          | —         |
| 18716                                                | Oakbank Boronia                | J. O. Robinson, Meadows            | Ayrshire | 30/9/29  | 3 236           | 4,455       | 4.03            | 179.39            | 210          | Dried off |
| 10942                                                | Lady Mariner of Eastview       | H. H. Shillabeer, West Croydon     | I.M.S.   | 11/2/30  | 3 225           | 2,070       | 3.69            | 76.28             | 60           | Sold      |
| 20823                                                | Dinah of Hampden               | C. C. T. Ottens Brinkworth         | Jersey   | 3/12/29  | 3 328           | 1,440       | 4.93            | 71.03             | 60           | Sold      |
| JUNIOR FOUR-YEAR-OLDS—STANDARD, 300 LBS.             |                                |                                    |          |          |                 |             |                 |                   |              |           |
| 19069                                                | Countess of Hampden            | E. W. Pitzner, Eudunda             | Jersey   | 15/9/29  | 4 13            | 10,987½     | 4.93            | 541.41            | 273          | —         |
| 19064                                                | Burnlea Glory                  | J. M. Hudd, Bletchley              | "        | 19/8/29  | 4 126           | 8,364       | 5.27            | 447.65            | 273          | —         |
| 14960                                                | Royal's Clarabelle 3rd Wangara | S. N. Bott, Murray Bridge          | M.S.     | 12/5/29  | 4 57            | 1,554½      | 4.11            | 438.94            | 273          | —         |
| 19049                                                | Iris of Para Wirra             | J. H. Dawkins, Gawler              | Jersey   | 27/7/29  | 4 52            | 8,124       | 4.64            | 377.19            | 273          | —         |
| 2348                                                 | Balaklava Daffodile            | A. E. Middleton, Balaklava         | Friesian | 17/7/29  | 4 53            | 9,126       | 4.01            | 385.38            | 240          | Dried off |
| 2194                                                 | Glenowie Griselda Posch        | H. Mountstephen, Monteith          | "        | 8/4/29   | 4 146           | 11,146      | 3.19            | 355.08            | 273          | —         |
| 10933                                                | Lucky Faith 2nd of East View   | H. H. Shillabeer, West Croydon     | I.M.S.   | 20/5/29  | 4 90            | 7,980½      | 4.32            | 342.35            | 273          | —         |
| Not allotted                                         | Henley Eileen Alida            | H. T. Kleeman, Myponga             | Friesian | 7/9/29   | 4 100           | 10,519½     | 3.23            | 339.51            | 273          | —         |
| 14712                                                | Kyby Paulina                   | Government Farm, Kybybolite        | Ayrshire | 4/9/29   | 4 134           | 8,812½      | 3.83            | 337.81            | 273          | —         |
| 20824                                                | Queenbird 4th of Eden Park     | J. T. Oates, Kangaroo Flat         | Jersey   | 19/9/29  | 4 15            | 5,317½      | 6.02            | 320.20            | 273          | —         |
| 20755                                                | Millie 30th of Willow Farm     | T. B. Brooks, Clarendon            | "        | 7/9/29   | 4 34            | 5,700       | 5.50            | 313.76            | 240          | Dried off |
| 14711                                                | Kyby Miranda                   | Government Farm, Kybybolite        | Ayrshire | 29/8/29  | 4 126           | 7,732½      | 3.89            | 301.18            | 273          | —         |
| Not allotted                                         | Gen 10th of Darbalara          | H. B. Kuchel Murray Bridge         | M.S.     | 14/4/29  | 4 176           | 6,064½      | 4.26            | 258.18            | 273          | —         |
| 19234                                                | Henley Boundful Eileen         | H. T. Kleeman, Myponga             | Friesian | 15/8/29  | 4 34            | 7,110       | 3.62            | 257.01            | 210          | Dried off |
| Not allotted                                         | West Kilbride Wynette          | H. D. Secomb & Son, Two Wells      | Ayrshire | 12/10/29 | 4 27            | 5,415       | 4.59            | 248.77            | 240          | Dried off |



PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.—continued.

| Head Book No.                                       | Name of Cow.                     | Owner.                            | Breed.   | Calved.  | Age at Calving. | Total Milk. | Average Test. | Total Butter-fat. | Days Tested. | Remarks.            |
|-----------------------------------------------------|----------------------------------|-----------------------------------|----------|----------|-----------------|-------------|---------------|-------------------|--------------|---------------------|
| JUNIOR FOUR-YEAR-OLDS—STANDARD, 300 LBS.—continued. |                                  |                                   |          |          |                 |             |               |                   |              |                     |
| 14708                                               | Kyby Leucantha                   | Government Farm, Kybybolite       | Ayrshire | 28/7/29  | 4 161           | 6,382½      | 3.87          | 247.16            | 273          | —                   |
| 14709                                               | Loranthe of Kybybolite           | Government Farm, Kybybolite       | "        | 29/8/29  | 4 38            | 4,080       | 4.60          | 187.82            | 240          | Dried off           |
| 16936                                               | Penguin of Eastview              | H. H. Shillabeer, West Croydon    | I.M.S.   | 29/12/29 | 4 85            | 4,305       | 3.82          | 164.32            | 120          | Sold                |
| 18784                                               | Oakbank Rustie                   | J. O. Robinson, Meadows           | Ayrshire | 20/9/29  | 4 2             | 3,450       | 4.04          | 139.21            | 150          | Dried off           |
| SENIOR FOUR-YEAR-OLDS—STANDARD, 325 LBS.            |                                  |                                   |          |          |                 |             |               |                   |              |                     |
| 1919                                                | Murray Glen Sylvia Patch         | C. J. Morris, Monteth             | Friesian | 14/5/29  | 4 360           | 14,323½     | 4.23          | 605.84            | 273          | —                   |
| 2458                                                | Genowie Griseida Patch           | E. W. Peterson, Long Flat         | "        | 29/8/29  | 4 291           | 15,030      | 3.03          | 590.36            | 273          | —                   |
| 8474                                                | Venus 3rd of East View           | H. H. Shillabeer, West Croydon    | I.M.S.   | 12/4/29  | 4 316           | 10,897½     | 3.91          | 426.13            | 273          | —                   |
| 20925                                               | Judith of Talunga                | C. C. T. Ottens, Brinkworth       | Jersey   | 3/7/29   | 4 213           | 8,493       | 4.79          | 407.03            | 273          | —                   |
| 20752                                               | Millie 28th of Willow Farm       | A. B. A. Weckert, Brinkworth      | "        | 10/6/29  | 4 281           | 8,930       | 5.06          | 350.80            | 273          | —                   |
| 16947                                               | Roseworthy Princess 14th         | Agricultural College, Roseworthy  | "        | 18/4/29  | 4 340           | 8,331½      | 6.18          | 335.84            | 273          | —                   |
| 2301                                                | River Glen Rosey                 | L. H. and P. C. Giles, Auburn     | Friesian | 11/10/29 | 4 274           | 9,665       | 3.29          | 327.71            | 240          | Dried off           |
| 17913                                               | Lady Merdon of Eudunda           | W. S. McAuliffe, Eudunda          | Jersey   | 13/7/29  | 4 252           | 8,137½      | 6.24          | 320.41            | 273          | Dried off           |
| Not allocated                                       | Henley Fobes Pictie              | H. T. Kleeman, Mypolonga          | Friesian | 23/4/29  | 4 219           | 8,415       | 3.99          | 319.57            | 240          | Dried off           |
| 20732                                               | Maud 5th of East View            | H. H. Shillabeer, West Croydon    | I.M.S.   | 22/8/29  | 4 272           | 7,725       | 4.09          | 315.80            | 273          | —                   |
| 17883                                               | Daisy of Talunga                 | J. A. Bradtke, Yongala            | Jersey   | 14/6/29  | 4 235           | 6,702       | 4.98          | 213.62            | 273          | —                   |
|                                                     | Pembroke Viola                   | C. W. Ansell, Bletchley           | "        | 31/8/29  | 4 295           | 5,251½      | 5.75          | 305.91            | 273          | —                   |
| 3002                                                | Belvoir Olda's Mercury           | T. J. H. Dodd, Mypolonga          | Friesian | 1/7/29   | 4 250           | 8,355       | 3.35          | 279.48            | 210          | Withdrawn from test |
| 17919                                               | Pimpinel 4th of Oakhill          | Mrs. B. G. Neumann, Hampden       | Jersey   | 28/7/29  | 4 311           | 3,900       | 6.34          | 247.09            | 240          | Dried off           |
| 15294                                               | Oakbank Ready                    | J. O. Robinson, Meadows           | Ayrshire | 9/10/29  | 4 291           | 4,260       | 3.95          | 168.31            | 180          | Dried off           |
| MATURE COWS—STANDARD, 350 LBS.                      |                                  |                                   |          |          |                 |             |               |                   |              |                     |
| 1587                                                | Healey Sylvia Butterfly          | C. J. Morris, Monteth             | Friesian | 24/9/29  | 6 254           | 17,932½     | 3.22          | 577.38            | 273          | —                   |
| 1789                                                | Anama Maggie's Winsome           | W. Hawker, Clare                  | "        | 26/8/29  | 6 341           | 16,045½     | 3.57          | 572.32            | 273          | —                   |
| 819                                                 | Franna of East View              | T. J. H. Dodd, Mypolonga          | "        | 19/4/29  | 8 319           | 16,662      | 3.43          | 572.02            | 273          | —                   |
| 14633                                               | Belle of Morella                 | H. R. Walsh, Salisbury            | Jersey   | 22/4/29  | 6 84            | 9,352½      | 5.75          | 537.99            | 273          | —                   |
| 16941                                               | Mayflower of Hampden             | J. A. J. Pfitzner, Hampden        | "        | 11/9/29  | 5 206           | 9,664½      | 5.53          | 534.81            | 273          | —                   |
| 17896                                               | Dora of Pella                    | A. B. Steber, Eudunda             | "        | 23/5/29  | 5 17            | 8,511       | 5.92          | 508.71            | 273          | —                   |
| 1917                                                | Murray Glen Inka Tulip           | C. J. Morris, Monteth             | Friesian | 4/8/29   | 5 19            | 10,429½     | 4.50          | 469.78            | 273          | —                   |
| 13416                                               | Topaz of Kybybolite              | Government Farm, Kybybolite       | Ayrshire | 2/9/29   | 5 58            | 9,631½      | 4.63          | 441.83            | 273          | —                   |
| 1916                                                | Murray Glen Griseida's Topsey    | C. J. Morris, Monteth             | Friesian | 29/7/29  | 5 58            | 13,255½     | 3.93          | 441.72            | 273          | —                   |
| 2407                                                | Cliffside Flower Rosey           | H. T. Kleeman, Mypolonga          | "        | 24/4/29  | 5 82            | 12,702      | 3.93          | 423.61            | 273          | —                   |
| 12895                                               | Joffre's Jesamina II. of Wangara | S. N. Bott, Murray Bridge         | M.S.     | 17/5/29  | 7 293           | 11,439      | 3.70          | 422.98            | 273          | —                   |
| 12843                                               | Mariposa of Hampden              | J. A. F. Pfitzner, Hampden        | Jersey   | 9/7/29   | 8 88            | 7,021½      | 5.90          | 414.09            | 273          | —                   |
| 11327                                               | Millie 16th of Willow Farm       | J. H. Dawkins, Gawler             | "        | 9/8/29   | 8 255           | 7,863       | 5.23          | 411.20            | 273          | —                   |
| 1057                                                | Dairymaid 22nd of Lilydale       | H. T. Kleeman, Mypolonga          | Friesian | 22/4/29  | 8 296           | 12,805½     | 3.20          | 409.17            | 273          | —                   |
| 4451                                                | Fanny of Swanlea                 | H. H. Shillabeer, West Croydon    | I.M.S.   | 4/6/29   | 11 7            | 9,802½      | 4.15          | 406.59            | 273          | —                   |
| 16903                                               | Cherry 10th of Willow Farm       | J. H. Dawkins, Gawler             | Jersey   | 17/7/29  | 5 17            | 7,401       | 5.48          | 405.26            | 273          | —                   |
| 17889                                               | Jean III. of Dalebank            | C. W. Ansell, Bletchley           | "        | 27/8/29  | 8 334           | 8,128½      | 4.96          | 403.32            | 273          | —                   |
| 8922                                                | Jane of Korral                   | J. A. J. Pfitzner, Hampden        | "        | 29/6/29  | 8 312           | 7,686       | 5.23          | 401.84            | 273          | —                   |
| 19232                                               | West Kilbride Florette           | J. H. D. Seaborn & Son, Two Wells | Ayrshire | 12/9/29  | 6 312           | 9,154½      | 4.35          | 398.07            | 273          | —                   |
| 12078                                               | Danet III. of Brinkley           | W. S. McAuliffe, Eudunda          | Jersey   | 25/7/29  | 7 222           | 6,891       | 5.69          | 392.07            | 273          | —                   |
| 20731                                               | Beauty of Talunga                | J. A. Bradtke, Yongala            | "        | 16/6/29  | 5 243           | 7,149       | 5.29          | 377.90            | 273          | —                   |



PURE-BRED COWS COMPLETING OFFICIAL TEST FROM JANUARY 1ST, 1930, TO JUNE 30TH, 1930.—continued.

| Head Book No.                           | Name of Cow.                      | Owner.                               | Breed.   | Calved.  | Age at Calving. | Total Milk. | Average Test. | Total Butter-fat. | Days Tested. | Remarks.  |
|-----------------------------------------|-----------------------------------|--------------------------------------|----------|----------|-----------------|-------------|---------------|-------------------|--------------|-----------|
| MATURE COWS—STANDARD 350LBS.—continued. |                                   |                                      |          |          |                 |             |               |                   |              |           |
|                                         |                                   |                                      |          |          | Yrs. Days.      | Lbs.        | %             | Lbs.              |              |           |
| 5942                                    | Favourite of Hill View            | H. H. Shillaber, West Croydon.       | I.M.S.   | 28/4/29  | 9 145           | 9,936       | 3.78          | 375.63            | 273          | —         |
| 17014                                   | Charvellette of Onchialinga       | J. T. Oates, Kangaroo Flat.          | Jersey   | 26/7/29  | 5 5             | 6,854       | 5.76          | 365.91            | 273          | —         |
| 17594                                   | Princess 6th of Willow Farm       | J. T. Oates, Kangaroo Flat.          | Jersey   | 31/5/29  | 5 199           | 6,745       | 5.33          | 350.39            | 273          | —         |
| 18399                                   | Daisy 24th of Dunalley            | S. N. Bott, Murray Bridge.           | M.S.     | 19/5/29  | 7 246           | 8,646       | 4.16          | 359.07            | 273          | —         |
| 16844                                   | Madison 5th of Willow Farm        | W. A. Rodda, Salisbury.              | Jersey   | 2/9/29   | 6 261           | 6,528       | 5.41          | 353.41            | 273          | —         |
| 8076                                    | East View 8th of Willow Farm      | J. J. H. Dodd, Myponga.              | Friesian | 24/9/29  | 5 316           | 10,989      | 3.21          | 352.27            | 273          | —         |
| 17925                                   | Roseworthy Sunlight               | Agricultural College, Roseworthy.    | Jersey   | 5/9/29   | 5 49            | 6,564       | 5.28          | 346.08            | 273          | —         |
| 10354                                   | Rosetta of Hilldale               | J. A. Halliday, Murray Bridge.       | Friesian | 25/8/29  | 5 114           | 7,312       | 4.06          | 341.89            | 273          | Withdrawn |
| 10992                                   | Agnes of Kybybolite               | Government Farm, Kybybolite.         | Ayrshire | 25/7/29  | 9 53            | 10,440      | 3.21          | 335.33            | 180          | —         |
| 15074                                   | Lotus of Oakbank                  | Mrs. B. G. Neumann, Hampden.         | Jersey   | 7/6/29   | 8 199           | 7,896       | 4.09          | 323.28            | 273          | —         |
| 17926                                   | Bonzola Mill                      | J. T. Kteenan, Myponga.              | Jersey   | 5/4/29   | 8 43            | 5,235       | 6.13          | 320.74            | 240          | Dried off |
| 760                                     | Violet 6th of Bayview             | C. W. Gray, Langhorne's Creek.       | Friesian | 24/5/29  | 6 61            | 6,493       | 4.83          | 313.80            | 273          | —         |
| 10993                                   | Aurea of Kybybolite               | Government Farm, Kybybolite.         | Ayrshire | 15/7/29  | 6 205           | 9,037       | 3.45          | 311.49            | 273          | —         |
| 19233                                   | West Kibbidge Innette             | H. D. Seacombe & Son, Two Wells.     | Jersey   | 4/8/29   | 8 2             | 7,522       | 4.14          | 309.74            | 273          | —         |
| 9017                                    | Rose of Kybybolite                | Government Farm, Kybybolite.         | Jersey   | 16/5/29  | 9 178           | 8,644       | 3.59          | 310.31            | 273          | —         |
| 18451                                   | Viola II. of Dalebank             | C. W. Ansell, Blechley.              | Jersey   | 17/8/29  | 6 238           | 5,674       | 5.46          | 304.17            | 273          | —         |
| 8473                                    | Gladsome II. of East View         | H. H. Shillaber, West Croydon.       | I.M.S.   | 23/6/29  | 5 53            | 8,265       | 3.57          | 294.77            | 273          | —         |
| 16791                                   | Roseworthy Princess 16th          | Agricultural College, Roseworthy.    | Jersey   | 9/9/29   | 5 278           | 6,195       | 4.73          | 293.00            | 273          | —         |
| 17523                                   | Leslie Fowler 5th of Willow Farm  | H. T. Oates, Kangaroo Flat.          | I.M.S.   | 22/8/29  | 5 80            | 5,104       | 5.73          | 292.58            | 273          | —         |
| 8475                                    | Peach of East View                | H. H. Shillaber, West Croydon.       | M.S.     | 17/9/29  | 5 50            | 7,125       | 3.93          | 281.77            | 240          | Sold      |
| 13697                                   | Gayboy's Duchess of Wangara       | H. E. Kuchel, Murray Bridge.         | Ayrshire | 24/7/29  | 8 165           | 7,635       | 3.65          | 278.90            | 273          | —         |
| 13415                                   | Rose II. of Kybybolite            | Government Farm, Kybybolite.         | M.S.     | 6/6/29   | 5 24            | 6,784       | 4.10          | 278.07            | 273          | —         |
| Not allotted                            | Blossom of Northfield             | Insp.-Gen. of Hospitals, Bedford Pk. |          | 26/9/29  | 7 226           | 6,537       | 4.22          | 275.57            | 273          | —         |
| 8354                                    | Iris of Grantala                  | J. H. Dawkins, Gawler.               | Jersey   | 7/9/29   | 9 33            | 5,820       | 4.72          | 274.59            | 210          | Dried off |
| 13408                                   | Amara of Kybybolite               | Government Farm, Kybybolite.         | Ayrshire | 16/5/29  | 5 122           | 6,855       | 4.17          | 274.33            | 240          | Dried off |
| 2014                                    | St. Alban's Westernland Inka      | J. A. Halliday, Murray Bridge.       | Friesian | 1/8/29   | 6 140           | 6,855       | 3.87          | 265.55            | 180          | Withdrawn |
| 2009                                    | Roseworthy Moonlight              | J. A. Halliday, Murray Bridge.       | Jersey   | 6/8/29   | 7 69            | 8,145       | 3.22          | 262.31            | 180          | Withdrawn |
| 8466                                    | Viola II. of East View            | Agricultural College, Roseworthy.    | Jersey   | 9/7/29   | 6 36            | 4,980       | 5.17          | 257.28            | 240          | Dried off |
| 17522                                   | Melrose of Dalebank               | H. H. Shillaber, West Croydon.       | I.M.S.   | 15/10/29 | 5 296           | 5,895       | 4.16          | 245.43            | 180          | Sold      |
| 8464                                    | Fortune 1st of East View          | J. T. Oates, Kangaroo Flat.          | Jersey   | 1/10/29  | 5 132           | 4,920       | 5.91          | 241.52            | 240          | Withdrawn |
| 8481                                    | Lucky Pretymald III. of East View | H. H. Shillaber, West Croydon.       | I.M.S.   | 23/10/29 | 5 304           | 4,495       | 3.70          | 240.29            | 180          | Sold      |
| 20783                                   | Petunia of Talunga                | H. H. Shillaber, West Croydon.       | Jersey   | 14/12/29 | 5 42            | 5,115       | 4.67          | 238.98            | 150          | Sold      |
| 13411                                   | Daphne of Kybybolite              | J. A. Bradke, Yonkala.               | Ayrshire | 22/10/29 | 5 148           | 5,025       | 4.12          | 207.00            | 150          | Sold      |
| 15202                                   | Oakbank Beattie                   | Government Farm, Kybybolite.         | Ayrshire | 10/12/29 | 6 98            | 3,690       | 4.57          | 168.54            | 90           | Sold      |
| 10584                                   | Starbright of Dalebank            | J. O. Robinson, Meadows.             | Jersey   | 29/10/29 | 6 304           | 4,500       | 3.57          | 160.58            | 180          | Dried off |
| 14709                                   | Loranthe of Kybybolite            | H. R. Walsh, Salisbury.              | Ayrshire | 3/10/29  | 6 107           | 3,630       | 4.19          | 152.08            | 210          | Dried off |
| 11854                                   | Roseworthy Princess 14th          | Government Farm, Kybybolite.         | Ayrshire | 8/3/30   | 5 17            | 2,520       | 5.27          | 132.71            | 90           | Sold      |
| 16947                                   | Lady Grey 6th of Linden           | Agricultural College, Roseworthy.    | Jersey   | 7/2/30   | 5 254           | 1,995       | 6.21          | 123.89            | 90           | Dried off |
| 8476                                    | Pansy II. of East View            | R. H. Stubb, Clare.                  | I.M.S.   | 21/9/29  | 5 276           | 2,220       | 5.03          | 112.67            | 120          | Dried off |
| 8472                                    | Gladsome 1st of East View         | H. H. Shillaber, West Croydon.       | I.M.S.   | 19/2/30  | 5 204           | 2,460       | 4.86          | 107.31            | 60           | Sold      |
| 18192                                   | Glenrobin Carnation               | H. H. Shillaber, West Croydon.       | Ayrshire | 12/11/29 | 5 195           | 2,730       | 3.31          | 90.27             | 90           | Sold      |
| 13413                                   | Julia of Kybybolite               | J. O. Robinson, Meadows.             | Ayrshire | 30/11/30 | 5 137           | 1,605       | 4.31          | 69.24             | 90           | Dried off |
| 5350                                    | Marion 6rd of Hill View           | Government Farm, Kybybolite.         | I.M.S.   | 19/10/29 | 5 89            | 1,485       | 4.18          | 62.01             | 30           | Withdrawn |
|                                         |                                   | H. H. Shillaber, West Croydon.       |          | —/12/29  | 8 11mths        | 1,050       | 3.19          | 33.54             | 30           | Withdrawn |

COWS COMPLETING 365 DAYS TEST. FIGURES FOR 273 DAYS PUBLISHED PREVIOUSLY.

1430 Westmead Pontiac Gem II.

T. J. H. Dodd, Myponga.

Friesian

23/3/29

8 230

16,065

3.46

555.72

365



# THE HILLS HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR JUNE, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                        | Butterfat.            |                      |                       | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|------------------------|-----------------------|----------------------|-----------------------|---------------|
|          |                              |                              | Per Herd during June. | Per Cow during June. | Per Cow July to June.  | Per Herd during June. | Per Cow during June. | Per Cow July to June. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                   | Lbs.                  | Lbs.                 | Lbs.                  | %             |
| 7/D ...  | 26                           | 21-53                        | 10,751                | 413-50               | 6,832-22               | 439-32                | 16-90                | 289-90                | 4-09          |
| 7/E ...  | 27-97                        | 17-50                        | 7,859                 | 280-98               | 7,504-79               | 352-66                | 12-61                | 322-40                | 4-49          |
| 7/F ...  | 15                           | 14-93                        | 16,637                | 1,109-12             | 11,662-85              | 648-29                | 43-22                | 445-43                | 3-90          |
| 7/G ...  | 14                           | 10-83                        | 6,937 <sup>‡</sup>    | 474-11               | 7,315-17               | 275-48                | 19-68                | 309-64                | 4-15          |
| 7/H ...  | 7-93                         | 5-90                         | 3,184                 | 401-51               | 6,750-64               | 165-44                | 20-86                | 328-11                | 5-20          |
| 7/J ...  | 18                           | 18                           | 9,420                 | 523-33               | 6,893-43               | 461-02                | 25-61                | 324-14                | 4-89          |
| 7/K ...  | 13-90                        | 12-83                        | 7,648                 | 550-22               | 8,640-51               | 320-80                | 23-08                | 378-63                | 4-19          |
| 7/L ...  | 25-97                        | 20-63                        | 8,430 <sup>‡</sup>    | 324-62               | 6,534-60               | 425-01                | 16-37                | 303-26                | 5-04          |
| 7/O ...  | 17                           | 10-97                        | 3,940                 | 231-76               | 4,960-80               | 211-01                | 12-41                | 258-16                | 5-36          |
| 7/P ...  | 22                           | 21-93                        | 9,933                 | 451-50               | 6,115-73               | 497-39                | 22-61                | 298-56                | 5-01          |
| 7/S ...  | 13-10                        | 12-17                        | 9,885                 | 754-57               | 7,599-69               | 521-10                | 39-78                | 393-98                | 5-27          |
| 7/T ...  | 10                           | 6-57                         | 2,999 <sup>‡</sup>    | 299-95               | 5,874-47               | 128-57                | 12-86                | 257-72                | 4-29          |
| 7/U ...  | 17                           | 12-37                        | 6,734                 | 396-12               | 6,574-11               | 291-35                | 17-14                | 289-39                | 4-33          |
| 7/W ...  | 19                           | 14-77                        | 10,555                | 555-53               | 6,962-96               | 504-05                | 26-53                | 320-65                | 4-78          |
| 7/X ...  | 17-33                        | 10-57                        | 4,390 <sup>‡</sup>    | 251-61               | 6,731-60               | 186-38                | 10-70                | 285-31                | 4-25          |
| 7/Y ...  | 13                           | 12-73                        | 6,142 <sup>‡</sup>    | 472-50               | 5,871-57               | 308-63                | 23-74                | 287-19                | 5-02          |
| 7/Z ...  | 10                           | 9-87                         | 6,110                 | 611-00               | 6,003-77               | 264-18                | 26-42                | 263-14                | 4-32          |
| 7/AA ... | 7                            | 5-97                         | 2,816                 | 402-28               | 4,678-50               | 138-27                | 19-75                | 239-27                | 4-91          |
| 7/BB ... | 13                           | 11-87                        | 4,810 <sup>‡</sup>    | 370-04               | 6,379-59               | 223-24                | 17-17                | 279-24                | 4-64          |
| 7/Cc ... | 10                           | 8                            | 3,810                 | 381-00               | Sept.-June<br>6,628-77 | 196-54                | 19-65                | Sept.-June<br>308-34  | 5-16          |
| 7/Dd ... | 10                           | 6-97                         | 3,427                 | 342-70               | Nov.-June<br>4,644-75  | 184-11                | 18-41                | Nov.-June<br>235-33   | 5-37          |
| 7/V ...  | 12                           | 9-80                         | 1,328                 | 110-66               | 3,961-52               | 76-22                 | 6-35                 | 199-47                | 5-74          |
| Means .  | 15-42                        | 12-58                        | 6,700-82              | 434-61               | 6,868-80               | 309-91                | 20-10                | 311-74                | 4-62          |

# LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR JUNE, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                           | Butterfat.            |                      |                           | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|---------------------------|-----------------------|----------------------|---------------------------|---------------|
|          |                              |                              | Per Herd during June. | Per Cow during June. | Per Cow December to June. | Per Herd during June. | Per Cow during June. | Per Cow December to June. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                      | Lbs.                  | Lbs.                 | Lbs.                      | %             |
| 6/B ...  | 19                           | 11-10                        | 6,279                 | 330-47               | 1,862-94                  | 241-06                | 12-69                | 83-47                     | 3-84          |
| 6/C ...  | 26-67                        | 17-67                        | 13,019                | 488-15               | 3,095-35                  | 523-18                | 19-62                | 142-66                    | 4-02          |
| 6/E ...  | 21                           | 15-13                        | 7,276                 | 347-09               | 2,192-81                  | 271-01                | 12-93                | 90-32                     | 3-72          |
| 6/F ...  | 20-80                        | 15-10                        | 15,882                | 763-56               | 3,135-78                  | 704-01                | 33-85                | 145-99                    | 4-48          |
| 6/I ...  | 18-57                        | 8-10                         | 4,323 <sup>‡</sup>    | 260-92               | 2,116-39                  | 160-13                | 9-66                 | 92-70                     | 3-70          |
| 6/J ...  | 22-77                        | 18-23                        | 8,436 <sup>‡</sup>    | 370-51               | 2,982-27                  | 399-59                | 17-55                | 145-51                    | 4-74          |
| 6/R ...  | 21                           | 15-90                        | 7,173 <sup>‡</sup>    | 341-59               | 1,629-02                  | 360-68                | 17-18                | 89-80                     | 5-08          |
| 6/U ...  | 26                           | 17-80                        | 5,091                 | 195-81               | 1,754-95                  | 214-51                | 8-25                 | 75-31                     | 4-21          |
| 6/W ...  | 23                           | 17                           | 9,826 <sup>‡</sup>    | 427-24               | 3,285-30                  | 451-65                | 19-64                | 160-20                    | 4-60          |
| 6/X ...  | 26                           | 21-37                        | 15,122 <sup>‡</sup>   | 581-63               | 5,849-05                  | 595-20                | 22-89                | 238-30                    | 3-94          |
| 6/Y ...  | 21-60                        | 12-13                        | 6,418                 | 297-13               | 2,662-80                  | 277-46                | 12-85                | 114-59                    | 4-32          |
| 6/BB ... | 18                           | 9-97                         | 3,342 <sup>‡</sup>    | 185-69               | 1,660-83                  | 147-44                | 8-19                 | 76-57                     | 4-41          |
| 6/DD ... | 31-87                        | 20-80                        | 11,945                | 374-80               | 3,116-97                  | 554-43                | 17-40                | 188-91                    | 4-64          |
| 6/EE ... | 45-30                        | 34-48                        | 14,756                | 325-74               | 3,884-26                  | 640-33                | 14-14                | 175-20                    | 4-34          |
| 6/FF ... | 26-13                        | 14-50                        | 6,160 <sup>‡</sup>    | 235-76               | 2,770-11                  | 273-84                | 10-48                | 124-53                    | 4-44          |
| 6/II ... | 32-60                        | 29-70                        | 14,390                | 442-77               | 4,351-11                  | 652-70                | 20-08                | 198-07                    | 4-54          |
| 6/JK ... | 26                           | 25-80                        | 10,079                | 387-65               | 4,253-41                  | 453-23                | 17-43                | 187-25                    | 4-50          |
| 6/KK ... | 20-13                        | 17-80                        | 9,407                 | 467-31               | 4,185-38                  | 464-64                | 23-08                | 195-02                    | 4-94          |
| 6/LL ... | 26-78                        | 21-23                        | 9,243                 | 345-79               | 3,963-70                  | 382-71                | 14-32                | 166-97                    | 4-14          |
| 6/MM ... | 18                           | 11-27                        | 5,899                 | 358-19               | 2,595-03                  | 275-95                | 17-21                | 140-53                    | 4-33          |
| 6/NN ... | 19                           | 19                           | 4,230                 | 222-68               | 2,491-68                  | 232-66                | 12-24                | 112-57                    | 5-50          |
| 6/Oo ... | 19                           | 12                           | 5,085                 | 267-68               | 3,775-20                  | 242-60                | 12-77                | 170-79                    | 4-77          |
| Means .  | 23-87                        | 17-50                        | 8,781-11              | 367-92               | 3,168-19                  | 387-19                | 16-22                | 142-56                    | 4-41          |



## NARRUNG HERD TESTING ASSOCIATION.

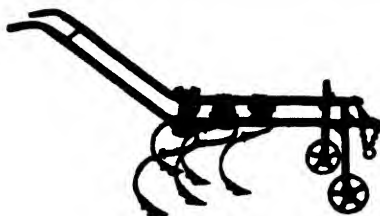
## RESULTS OF BUTTERFAT TESTS FOR JUNE, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                          | Butterfat.            |                      |                          | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|--------------------------|-----------------------|----------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during June. | Per Cow during June. | Per Cow October to June. | Per Herd during June. | Per Cow during June. | Per Cow October to June. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                     | Lbs.                  | Lbs.                 | Lbs.                     | %             |
| 5/C ...  | 30-33                        | 23-90                        | 12,869                | 424-80               | 4,249-85                 | 604-69                | 19-94                | 213-16                   | 4-70          |
| 5/D ...  | 28-70                        | 16-93                        | 9,089                 | 327-25               | 3,915-26                 | 473-32                | 17-08                | 207-02                   | 5-21          |
| 5/E ...  | 40-20                        | 28-07                        | 13,053                | 324-51               | 3,874-25                 | 717-93                | 17-85                | 210-18                   | 5-49          |
| 5/F ...  | 20-17                        | 9-63                         | 3,318                 | 164-50               | 3,395-54                 | 151-67                | 7-52                 | 149-52                   | 4-57          |
| 5/O ...  | 27                           | 16-10                        | 9,076½                | 336-17               | 3,756-77                 | 434-90                | 16-11                | 199-18                   | 4-79          |
| 5/R ...  | 49                           | 30-70                        | 13,881                | 283-15               | 2,939-86                 | 586-54                | 11-96                | 132-60                   | 4-23          |
| 5/S ...  | 28-47                        | 26-13                        | 12,148                | 426-69               | 3,558-45                 | 632-46                | 22-21                | 182-61                   | 5-21          |
| 5/T ...  | 22                           | 15-50                        | 8,986½                | 408-48               | 3,707-53                 | 429-45                | 19-52                | 176-61                   | 4-78          |
| 5/U ...  | 18-27                        | 16-63                        | 16,558½               | 906-32               | 7,027-01                 | 752-62                | 41-19                | 325-11                   | 4-55          |
| 5/V ...  | 26-90                        | 20-63                        | 6,112½                | 227-23               | 2,884-98                 | 277-79                | 10-33                | 146-09                   | 4-54          |
| 5/Y ...  | 24-43                        | 20-20                        | 11,038½               | 451-84               | 5,202-27                 | 648-87                | 26-56                | 289-35                   | 5-88          |
| 5/Z ...  | 33                           | 29-47                        | 22,896                | 693-82               | 6,003-56                 | 1,185-72              | 35-93                | 290-13                   | 5-18          |
| 5/AA ... | 18                           | 15-93                        | 6,497½                | 360-97               | 3,887-29                 | 363-58                | 20-20                | 211-56                   | 5-60          |
| 5/Co ... | 32-37                        | 23-87                        | 14,019½               | 433-10               | 2,825-48                 | 609-61                | 18-83                | 123-59                   | 4-35          |
| 5/DD ... | 21-20                        | 17-73                        | 6,425                 | 303-06               | 4,247-88                 | 345-90                | 16-32                | 222-47                   | 5-38          |
| 5/EE ... | 17                           | 5-27                         | 1,864                 | 109-65               | 3,961-40                 | 115-24                | 6-78                 | 210-82                   | 6-18          |
| 5/GG ... | 17                           | 11-90                        | 4,783½                | 281-38               | 3,887-52                 | 224-08                | 13-18                | 191-00                   | 4-68          |
| 5/HH ... | 18                           | 9-27                         | 3,066½                | 170-36               | 3,167-73                 | 147-95                | 8-22                 | 151-29                   | 4-82          |
| 5/II ... | 25-57                        | 18-60                        | 11,177                | 437-11               | 4,890-19                 | 538-03                | 21-04                | 233-35                   | 4-81          |
| 5/JJ ... | 27                           | 16-23                        | 10,664                | 394-96               | 4,320-20                 | 443-62                | 16-43                | 190-27                   | 4-16          |
| 5/KK ... | 22-33                        | 19-80                        | 10,834½               | 485-19               | 3,981-75                 | 495-71                | 22-20                | 189-75                   | 4-58          |
| 5/LL ... | 21-77                        | 20-77                        | 7,962½                | 365-75               | 3,570-08                 | 388-87                | 17-86                | 162-25                   | 4-88          |
| Means .. | 25-85                        | 18-78                        | 9,832-75              | 380-37               | 3,983-88                 | 480-39                | 18-58                | 196-78                   | 4-89          |

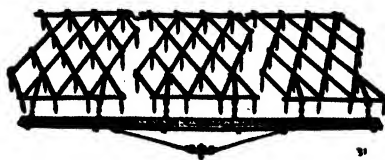
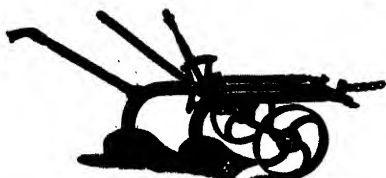
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ADELAIDE.



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.  
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending July 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|-----------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                 | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                   | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 40                                  | (5) 44                  | (6) *                   | 84      |
| Williams, W. R. ....     | Frewville .....     | (7) 49                                  | (8) 67                  | (9) 96                  | 212     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 67                                 | (11) 76                 | (12) *                  | 143     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 61                                 | (14) 79                 | (15) *                  | 140     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 32                                 | (17) *                  | (18) *                  | 32      |
| Pearman, E. D. ....      | Rosewater .....     | (19) 60                                 | (20) 58                 | (21) 57                 | 175     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                  | (23) *                  | (24) 58                 | 58      |
| Burton, C. J. C. ....    | Mallala .....       | (25) 70                                 | (26) 63                 | (27) 65                 | 198     |
| Heath, H. E. ....        | Mile End .....      | (28) 62                                 | (29) *                  | (30) 52                 | 114     |
| Heath, H. E. ....        | Mile End .....      | (31) 57                                 | (32) 35                 | (33) 60                 | 152     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 43                                 | (35) 61                 | (36) 69                 | 173     |
| Howard, T. W. ....       | Woodville .....     | (37) 77                                 | (38) 33                 | (39) 56                 | 166     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                  | (41) 68                 | (42) 54                 | 122     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 32                                 | (44) 74                 | (45) 68                 | 174     |
| Gameau, V. F. ....       | Woodville .....     | (46) 62                                 | (47) 52                 | (48) 30                 | 144     |
| Gameau, V. F. ....       | Woodville .....     | (49) 67                                 | (50) 23                 | (51) 56                 | 146     |
| Aird, J. R. & Son ....   | Kilkenny .....      | (52) 47                                 | (53) 58                 | (54) 68                 | 173     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                  | (56) 68                 | (57) *                  | 68      |
| Barrett, L. ....         | Angaston .....      | (58) 32                                 | (59) 39                 | (60) 52                 | 123     |
| Barrett, L. ....         | Angaston .....      | (61) *                                  | (62) 15                 | (63) 69                 | 84      |
| Barrett, L. ....         | Angaston .....      | (64) 43                                 | (65) 18                 | (66) 27                 | 88      |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 41                                 | (68) 51                 | (69) 67                 | 159     |
| Wiese, W. ....           | Cabra .....         | (70) 80                                 | (71) 66                 | (72) 59                 | 205     |
| Wiese, W. ....           | Cabra .....         | (73) 65                                 | (74) 66                 | (75) 54                 | 185     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 64                                 | (77) 62                 | (78) 61                 | 187     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                  | (80) *                  | (81) 58                 | 58      |
| Riggs, N. ....           | Camden Park .....   | (82) 83                                 | (83) 76                 | (84) *                  | 159     |
| Riggs, N. ....           | Camden Park .....   | (85) 83                                 | (86) 59                 | (87) 65                 | 207     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 62                                 | (89) 75                 | (90) 78                 | 215     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 35                                 | (92) 60                 | (93) 76                 | 171     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) *                                  | (95) 48                 | (96) *                  | 48      |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 74                                 | (98) 59                 | (99) *                  | 133     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 74                                | (101) 17                | (102) *                 | 91      |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 54                                | (104) *                 | (105) *                 | 54      |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 30                                | (107) 41                | (108) 46                | 117     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 59                                | (110) 84                | (111) *                 | 143     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 72                                | (113) 56                | (114) *                 | 128     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 53                                | (116) 54                | (117) 66                | 173     |
| Hill, W. ....            | Knoxville .....     | (118) 64                                | (119) 60                | (120) 63                | 187     |
| Hill, W. ....            | Knoxville .....     | (121) 68                                | (122) 60                | (123) 67                | 185     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 36                                | (125) *                 | (126) 62                | 98      |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                 | (128) 69                | (129) 64                | 133     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 10                                | (131) 65                | (132) 69                | 144     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 42                                | (134) 73                | (135) 72                | 187     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 75                                | (137) 66                | (138) 52                | 193     |
| Thomas, C. R. ....       | Heesterville .....  | (139) 72                                | (140) 46                | (141) 37                | 155     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.            | Address.            | Score for Month ended July 31st, 1930. |                         |                         |         |
|-------------------------|---------------------|----------------------------------------|-------------------------|-------------------------|---------|
|                         |                     | Bird No. and Eggs Laid.                | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Compton, R. C. ....     | Woodeforde .....    | (142) 9                                | (143) 73                | (144) 63                | 145     |
| Connor, D. C. ....      | Gawler .....        | (145) 21                               | (146) 49                | (147) 21                | 91      |
| Robinson, A. E. ....    | Hectorville .....   | (148) 82                               | (149) 72                | (150) 65                | 219     |
| Vann, R. S. ....        | New Hindmarsh ...   | (151) 53                               | (152) 35                | (153) 68                | 156     |
| McLean, J. G. ....      | Black Forest .....  | (154) 22                               | (155) 18                | (156) 40                | 80      |
| Fidge, H. ....          | Clarence Park ..... | (157) 27                               | (158) 40                | (159) * 7               | 67      |
| Fidge, H. ....          | Clarence Park ..... | (160) 24                               | (161) 24                | (162) 71                | 119     |
| Tolhurst, A. E. ....    | Torrens Park .....  | (163) 78                               | (164) 25                | (165) *                 | 103     |
| Tolhurst, A. E. ....    | Torrens Park .....  | (166) 77                               | (167) 26                | (168) 79                | 182     |
| Monkhouse, A. J. ....   | Woodside .....      | (169) 67                               | (170) 57                | (171) *                 | 124     |
| Monkhouse, A. J. ....   | Woodside .....      | (172) *                                | (173) *                 | (174) 52                | 52      |
| Monkhouse, A. J. ....   | Woodside .....      | (175) 42                               | (176) *                 | (177) *                 | 42      |
| Monkhouse, A. J. ....   | Woodside .....      | (178) *                                | (179) *                 | (180) 23                | 23      |
| Sage, H. R. ....        | Nuriootpa .....     | (181) 30                               | (182) *                 | (183) 76                | 106     |
| Mitchell, W. J. ....    | Woodside .....      | (184) 66                               | (185) *                 | (186) 81                | 147     |
| George, L. E. ....      | Redfern .....       | (187) 76                               | (188) 80                | (189) 48                | 204     |
| George, L. E. ....      | Redfern .....       | (190) 73                               | (191) 57                | (192) *                 | 130     |
| George, L. E. ....      | Redfern .....       | (193) 65                               | (194) 73                | (195) 71                | 209     |
| George, L. E. ....      | Redfern .....       | (196) 57                               | (197) 74                | (198) 82                | 213     |
| Aird, J. R., & Son .... | Kilkenny .....      | (199) 72                               | (200) 65                | (201) *                 | 137     |
| Aird, J. R., & Son .... | Kilkenny .....      | (202) 45                               | (203) 29                | (204) 29                | 103     |
| Gameau, V. F. ....      | Woodville .....     | (205) 54                               | (206) 36                | (207) 43                | 133     |
| Totals.....             |                     | 3,237                                  | 3,077                   | 2,955                   | 9,269   |

*Section 3.—Black Orpingtons.*

| Competitors.            | Address.            | Score for Month ending July 31st, 1930. |                         |                         |         |
|-------------------------|---------------------|-----------------------------------------|-------------------------|-------------------------|---------|
|                         |                     | Bird No. and Eggs Laid.                 | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Aird, J. R., & Son .... | Kilkenny .....      | (208) 52                                | (209) 78                | (210) 51                | 181     |
| Aird, J. R., & Son .... | Kilkenny .....      | (211) 26                                | (212) 65                | (213) *                 | 91      |
| Williams, W. R. ....    | Frewville .....     | (214) 45                                | (215) 63                | (216) 62                | 170     |
| Williams, W. R. ....    | Frewville .....     | (217) †                                 | (218) *                 | (219) 28                | 28      |
| Gurr, A. and H. ....    | Scott's Creek ..... | (220) *                                 | (221) *                 | (222) *                 | —       |
| Andrewartha, A. ....    | Underdale .....     | (223) *                                 | (224) 76                | (225) 76                | 152     |
| McFarlane, A. S. ....   | Kilkenny .....      | (226) 76                                | (227) 66                | (228) 66                | 208     |
| Connor, D. C. ....      | Gawler .....        | (229) *                                 | (230) 49                | (231) *                 | 49      |
| Gillick, W. J. ....     | New Hindmarsh ...   | (232) 44                                | (233) *                 | (234) *                 | 44      |
| Osborn, E. L. ....      | Camden .....        | (235) 69                                | (236) 55                | (237) 63                | 187     |
| Totals.....             |                     | 312                                     | 452                     | 346                     | 1,110   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.            | Score for Month ending July 31st, 1930. |                         |                         |         |
|--------------------|---------------------|-----------------------------------------|-------------------------|-------------------------|---------|
|                    |                     | Bird No. and Eggs Laid.                 | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Gameau, V. F. .... | Woodville .....     | (238) 37                                | (239) 53                | (240) 8                 | 98      |
| Fidge, H. ....     | Clarence Park ..... | (241) 56                                | (242) 51                | (243) 24                | 131     |
| Totals.....        |                     | 93                                      | 104                     | 32                      | 229     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



## EGG-LAYING COMPETITION CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

### WINTER TEST.

The Winter Test of the Egg Laying Competition conducted at Parafield Poultry Station, concluded on July 31st, a period of 122 days.

### EGG WEIGHING.

In order to qualify for continuance in the competition the regulations stated:—"That every egg laid by each bird from July 1st, to July 31st, 1929, will be weighed the day after it is laid. Qualifications for the purpose of this test shall be that 60 per cent. of the eggs laid during July, 1929, must be 2ozs. in weight or over." Therefore, the scores of all birds failing in the weight of eggs have been dropped. The number of birds disqualified for under-weight eggs is as follows:—

Section 1—White Leghorns and any other light breed, 32 from 207 birds competing.

Section 3—Black Orpingtons, 19 from 30 birds competing.

Section 4—Any other heavy breed, no rejections.

The average production per bird in each section is as follows:—

Section 1—White Leghorns, 56 eggs per bird, which is equivalent to 45 per cent.

Section 1—Any other light breed, 44 eggs per bird, which is equivalent to 36 per cent. production.

Section 3—Black Orpingtons, 58 eggs per bird, which is equivalent to 47.5 per cent.

Section 4—Any other heavy breed, 38 eggs per bird, which is equivalent to 31 per cent.

The average production for all birds under test was 56 eggs.

The following are the leading scores in each section from April 1st to July 31st:—

## RED COMB EGG ASSOCIATION, INCORPORATED.

### OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1930-31.

CONDUCTED AT PARAFIELD POULTRY STATION UNDER THE SUPERVISION OF THE  
DEPARTMENT OF AGRICULTURE.

Winter Test. Commenced April 1st, 1930. Terminated July 31st, 1930.

*Section 1.—White Leghorns, 204 birds; Black Minorcas, 3 birds.*

| Singles.                    | Score. | Bird Nos.                  |
|-----------------------------|--------|----------------------------|
| 1. W. R. Williams . . . . . | 96     | 9 A White Leghorn pullet   |
| 2. T. C. Manuel . . . . .   | 84     | 110 A White Leghorn pullet |
| 3. N. Riggs . . . . .       | 83     | 82 A White Leghorn pullet  |
| 3. N. Riggs . . . . .       | 83     | 85 A White Leghorn pullet  |

*Section 3.—Black Orpingtons, 30 birds.*

| Singles.                      | Score. | Bird Nos.                    |
|-------------------------------|--------|------------------------------|
| 1. J. R. Aird & Son . . . . . | 78     | 209 A Black Orpington pullet |
| 2. A. Andrewartha . . . . .   | 76     | 224 A Black Orpington pullet |
| 2. A. Andrewartha . . . . .   | 76     | 225 A Black Orpington Pullet |
| 2. A. S. McFarlane . . . . .  | 76     | 226 A Black Orpington pullet |

*Section 4.—(Rhode Island Reds), Any Other Heavy Breed.*

| Singles.                  | Score. | Bird Nos.                     |
|---------------------------|--------|-------------------------------|
| 1. H. Fidge . . . . .     | 58     | 241 A Rhode Island Red pullet |
| 2. V. F. Gameau . . . . . | 53     | 239 A Rhode Island Red pullet |
| 3. H. Fidge . . . . .     | 51     | 242 A Rhode Island Red pullet |



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## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### CONFERENCE OF UPPER NORTH BRANCHES.

Branches of the Agricultural Bureau in the Upper North Districts of the State met in Conference at Tarcowie on Thursday, July 17th. Messrs. F. Coleman (Chairman Advisory Board of Agriculture), Professor Perkins (Director of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), A. H. Robin (Government Veterinary Officer), E. L. Orchard (Agricultural Instructor), J. O. Hatter (Dairy Instructor), H. C. Pritchard (General Secretary Agricultural Bureau), and F. C. Richards (Assistant Secretary) represented the Department of Agriculture. There was a large attendance of delegates from the following Branches:—Caltowie, Laura, Tarcowie, Wirrabara, Appila-Yarrowie, Booleroo Centre, Wepowie, Gladstone, Morehard, Willowie, Ororoo, Eurelia, Murraytown, Black Rock, Eurelia Women's, Jamestown, and Yandiah. Mr. H. F. Ninnies, of the Tarcowie Branch, presided, and extended a cordial welcome to officers of the Department and delegates from neighboring Branches. Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) delivered the opening address.

The following papers were read and discussed:—"Power Farming," Mr. W. Ninnies (Tarcowie); "The Other Side of the Tractor Question," Mr. P. Curnow (Wirrabara); "Mechanical Work as a Necessary Part of Farm Knowledge," Mr. C. Stott (Eurelia); "Buy Australian Goods," Mr. E. Rooke (Wepowie); "Animals on the Farm," Mr. C. Schultz (Morehard); and "The Registration of Bulls," Mr. C. Knauerhase (Wepowie).

It was decided to hold the 1931 Conference at Willowie. On the motion of Mr. S. McCallum (Willowie), seconded by Mr. A. McCallum (Willowie), it was decided—"That this Branch ask Conference to request the Waterworks Department to deliver or post the readings of meters to all who rent meters, instead of attaching readings to meters." Mr. Crocker (Wepowie) moved and Mr. Orrock (Wepowie) seconded—"That the attention of the Government be drawn to the unnecessary delay in dealing with applications for assistance under the Drought Relief Act and paying for seed wheat supplies."

Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) presented to Messrs. C. Knauerhase and T. Orrock (Wepowie) and B. S. McCallum and H. Kupke (Morehard) certificates conferring on them the honor of life membership of the Agricultural Bureau of South Australia. Mr. Coleman also presented the following trophies won in the 1929-30 Upper North Crop Competition:—First prize, case of stainless cutlery, Mr. M. E. Meaney, 87 points, and E.P. cake dish, presented by the Cresco Fertiliser Coy.; second prize, Mr. L. Noonan, 86.5 points, E.P. fruit dish and a silver cup, presented by the Superphosphate Association of South Australia.

The evening session was occupied by addresses delivered by Messrs. W. J. Spafford (Deputy Director of Agriculture) and A. H. Robin (Government Veterinary Officer). The Conference concluded with a supper and dance.

### CONFERENCE AT CEDUNA.

The Annual Conference of Branches of the Agricultural Bureau situated in the western portion of Eyre Peninsula was held at Ceduna on Wednesday, July 2nd. The Department of Agriculture was represented by Messrs. A. M. Dawkins and S. Shepherd (Members of the Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. T. McKenna, B.V.Sc. (Government Veterinary Officer), W. H. Brownrigg (District Agricultural Instructor), and H. C. Pritchard (General Secretary). There was a large and representative gathering from the following Branches:—Laura Bay, Mudamukla, Petina, Maltee, Koonibba, Goode, Nunjikompita, Charra, and Smoky Bay.



Mr. E. D. Barnett (Chairman of the Laura Bay Branch) presided, and the opening address was delivered by Mr. A. M. Dawkins (Member of the Advisory Board). During the course of the Conference the following papers were read and discussed:—"Care of Farm Horses," Mr. H. Jones (Goode); "Improving the Fertility of the Soil," Mr. J. Spry (Laura Bay); "Young People on the Farm," Mr. W. Edson (Laura Bay).

A large number of questions were answered by departmental officers, and the following resolutions were carried:—1. "That this Branch is in favor of the Instructor of Agriculture being stationed in a more central position." 2. "That the next Conference be held at Ceduna, and that the Goode Branch be responsible for the arrangements."

During the evening session, at the request of the Branches constituting the Conference district, Professor A. J. Perkins (Director of Agriculture) delivered an address, "The Objects of the Compulsory Wheat Pool."

## VEGETABLES



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## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, July 30th, there being present Messrs. F. Coleman (Chairman), H. N. Wicks (Vice-Chairman), H. S. Taylor, P. H. Jones, A. J. Cooke, G. Jeffrey, R. H. Martin, J. W. Sandford, A. L. McEwin, Dr. A. E. V. Richardson (Director Waite Research Institute), and H. C. Pritchard (Secretary). Apologies were received from Mr. A. M. Dawkins, Professor A. J. Perkins, and Mr. W. R. Birks.

*Election of Officers.*—Mr. F. Coleman was re-elected Chairman and Mr. H. N. Wicks Vice-Chairman.

*Re-appointment of Members.*—The Secretary reported that Messrs. F. Coleman, H. N. Wicks, A. J. Cooke, A. M. Dawkins, P. H. Jones, and H. S. Taylor, who retired by the effluxion of time on June 30th, had been re-appointed for a further period of two years by the Hon. Minister of Agriculture.

*Experimental Work at Berri Orchard.*—Mr. Geo. Quinn (Chief Horticultural Instructor), in reporting on a resolution requesting that experiments might be conducted at the Berri Orchard on crops other than fruit trees and vines, which was carried at the River Murray Conference, said the matter of trying out economic crops had not escaped consideration.

A few years ago cotton was tried, the growth recorded, and a careful account kept of the costs of production and revenue received from a plot, which was fully reported upon at the time. Sugar beet was also tested, and the resulting growth of the plants noted. The possibilities of growing rice, peanuts, haricot beans, &c., was also gone into, but their cultivation not undertaken. Besides the heavy general costs of production, the great barrier to the general adoption of such crops was the outstanding fact that the contours of the land, and means of watering these irrigation areas in South Australia, had been designed wholly for deep rooting, perennial plants, such as trees and vines, which had been proved to be capable of standing for comparatively long periods between waterings. In California and other American States, as well as in the Murrumbidgee irrigation areas of New South Wales, where some of these crops succeed, water was available practically whenever it was desirable to apply it to the plants. Most of these annual or shallow-rooted heat-loving plants could be brought to a successful degree of production only where water could be given them at least once each week. To make trials with them or any similar crop possible at the Experimental Orchard, would involve expenditure on an efficient pumping plant costing probably several hundreds of pounds.

*Standardisation of Sultana Drying Methods.*—In accordance with a resolution carried at the Berri Conference, a copy of Mr. Arndt's paper on the above subject was forwarded to the Australian Dried Fruits Board, from whom the following reply was received:—"Referring to your letter on the subject of standardisation of sultana drying methods, I have to advise that this matter was very fully considered by the Australian Dried Fruits Board at a meeting held in Melbourne, and it has been decided to arrange a meeting of packers from the various States, to be held at Mildura during the second week in September, with a view to arriving at definite recommendations for the 1931 season."

*Stimulating Rainfall.*—Following the inquiry of the Board into the possibilities of research work being undertaken to determine the feasibility of stimulating rainfall, the Commonwealth Meteorologist furnished the reply set out hereunder:—"My opinion on the question is that Nature's allied forces operating in times of stress on Australia are far too vast and powerful to warrant any hope of their being overcome to such an extent as to be of material economic value. Consequently no experiments (other than laboratory) have been carried out by this Bureau. A number of proposals for producing or stimulating rain have been submitted to the Bureau, but as yet none has been considered to be of any practical value. On several occasions in past years experimentalists, not connected with this Bureau, have endeavored to produce rain over various parts of Australia, but without success. In this connection Mr. Balsillie's



experiments are mentioned:—“During 1916 and 1917 the late Mr. J. Graeme Balsillie, A.M.I.E.E. (with the assistance of a Government subsidy) carried out “Rain Making by Electricity” experiments at a few stations situated in the dry areas of Australia. A Rain Precipitation Investigation Committee was appointed by the New South Wales Government to report upon Mr. Balsillie’s experiments; the members of the Committee being:—Professor T. W. E. David (Chairman); Professor Charles E. Fawsitt; Mr. O. W. Brain, Chief Electrical Engineer for New South Wales Railways; Professor Oscar U. Vonwiller; Professor W. E. Cooke, Government Astronomer; Mr. Wm. Corin, Chief Electrical Engineer for Public Works, New South Wales; and Professor J. P. V. Madsen. The final report of the Committee presented to the Premier of New South Wales read as follows:—Resolution—That in view of the difficulty at present of our continuing the investigation with any advantage it should be closed. The Committee also desires to inform the Premier that inquiries made from the Commonwealth Meteorologist, Mr. H. A. Hunt, have resulted in information being obtained to the effect that meteorological observations taken over a period of Mr. Balsillie’s experiments absolutely fail to support in the slightest degree his claims that rainfall had been stimulated by the means which he had adopted.” The following entry was made in the minute book:—“In closing the investigation the Committee places on record the fact that no information whatever has been submitted for the consideration of members which justifies the claim that any advance has been made in Australia in the direction of causing or increasing rainfall.”

*Conference Resolutions, Ceduna.*—“That this Branch (Goode) is in favor of the Instructor in Agriculture being stationed in a more central position.” It was decided to submit the resolution to the Director of Agriculture for a report.

*Conference Resolutions, Tarowrie.*—(a) “That conference requests the Waterworks Department to deliver or post the readings of meters to all who rent meters instead of attaching readings to meters.” The Secretary was instructed to ascertain from the Waterworks Department if there was any reason why the proposal should not be adopted. (b) “That the attention of the Government be drawn to the unnecessary delay in dealing with applications for assistance under the Drought Relief Act and paying for seed wheat supplies.” It was decided to submit the resolution, together with a statement from a delegate at the Conference, to the State Bank.

*Observance of Fruit Pests Act.*—At the 1930 River Murray Conference a resolution was carried asking that steps be taken by the Department to enforce the Fruit Pests Act, especially in regard to codlin moth. Mr. Geo. Quinn (Chief Horticultural Instructor), to whom the resolution was forwarded, outlined the action he proposed to adopt in connection with the resolution.

*Instructors Judging at Country Shows.*—A resolution was received from the Blyth Branch asking the Department to reconsider its decision in not permitting District Instructors to judge at country shows. It was decided to refer the resolution to the Director for a report.

*Press Statements Concerning Agricultural Expenditure.*—Mr. H. N. Wicks drew attention to a statement that had appeared in the press referring to the amount expended by the State at the Experimental Farms and Orchards. Members present referred to the excellent research work that was being done at the institutions conducted under the administration of the Department of Agriculture, and it was decided, on the motion of Mr. Taylor, to forward the following resolution to the Hon. Minister of Agriculture:—“That in view of recent public statements respecting State establishments for agricultural education and research, this Board desires to record its conviction of the paramount necessity in a rural community such as South Australia of stimulating scientific research and education in agriculture.”

*Pruning Competitions.*—The Secretary was instructed to forward a letter to the Royal Agricultural and Horticultural Society, the Superphosphate Association of South Australia, Messrs. Gibbs, Bright Pty Co., Ltd., Nitrogen Fertilizers Pty. Co., Ltd., and W. Langdon Parsons, Esq., expressing the thanks and appreciation of the Advisory



Board for trophies donated to the championships of the River Murray and Lower North Pruning Competitions.

*Crop Competitions.*—In reply to a question asked by Mr. P. H. Jones, the Secretary intimated that although the subsidy for Wheat Crop Competitions had been withdrawn, the Department of Agriculture would co-operate, as far as possible, with District Committees in the continuing of the Competitions.

*Life Member.*—The name of Mr. J. S. Hammatt, of the Lyndoch Branch, was added to the roll of life members of the Agricultural Bureau.

*New Branches.*—Approval was given for the formation of Branches at Parilla (Women's), Upper Wakefield (Halbury), and Kyancutta, with the following as foundation members:—Parilla—Messdames C. Phillis, H. Johnston, C. R., and F. Kerley, S. Leane, C. Neindorf, C. Dabinett, A. Thompson, E. Howie, J. McCabe, G. Plew, R. Daniel, E. Pillifeant, R. Dawncey, J. Eckert, C. Hancock, J. Barry, F. Johnson, F. Smith, J. Seidel, A. Welden, Misses R. Phillis, M. Plew, E. Colwill, T. Seidel, H. and E. Johnson; Upper Wakefield (Halbury)—Messrs. W. Sanders, J. L., J., and B. Cleary, E. and C. Roberts, H. Simon, F. Neumann (2), M. Kiley, E. Martin, P. Higgs, M. Lally, J. Hartnett; Kyancutta—Messrs. C. Kammermann, H. Walters, R. Bedford, W. Mitchell, T. Holman, E. Kelly, H. McKenna, G. Dolan, R. Alsop, J. and E. Dyke, H. Longmire, J. and T. O'Loughlin, L. and F. Daniels, C. and A. Laube, R. Sampson, R. Miller, A. Cook, D. Fitzgerald, H. Little, B. Peters.

*New Members.*—The following names were added to the rolls of existing Branches:—Blackheath—A. McLellan; Morchard—H. R. Lillecrapp, A. C. Smith, P. Rhyne; Kulyan—Mr. Ritchie; Yeelanna—H. Owen, A. L. Carslake, G. Boumont, E. Manual; Yadanarie—L. S. Tyler; Poochera—F. R. Joy; Monarto South—J. L. Lofthouse, E. O. Gogel; Koppio—O. Tozer, S. Cooper, Hy. Tucknott, John Tucknott, W. C. Fogden, John Fogden, Frank Barraud; Wudinna—J. Bailey, L. Rowley; Murray Bridge—E. Butler; Wirrilla Women's—Mrs. S. Garrard; Nantawarra—K. W. Young; Bundaleer Springs—F. Officer, D. Mahoney; Clare—L. W. Butler, M. McEvoy, J. Lloyd, H. W. Lawrence, F. M. Ashby, R. McFeat, A. Phoenix; Pinnaroo—L. C. Fischer; Clare—A. H. Rogers, F. W. Knappstein, A. G. Coombs, W. R. G. Harmer, C. A. Wilcox, M. P. Vandborg, G. Smith, J. C. Dux, M. Lee, A. Lee, C. Neat, K. Russell, Les. Jarman, T. Gill, E. O'Shaughnessy, R. Smith, M. Fudge, V. Crawford, R. Fuller, M. Rogers, A. R. Ninnes; Berri—H. A. Fewster, H. M. Perkins, Robt. Curran, F. W. Seekamp; Eudunda—L. T. Duldig, A. R. Schultz, F. C. Lindner; Kapinnie—C. LeKraft, E. W. Franks; Appila—F. Winter; Tantanoola—Thos. Howe; Renmark—Robt. Edmeades, L. P. Johncock, W. E. Meier; Bowhill—A. Cockshell, A. Otto, E. B. Rohrlach; Tintinara—J. B. Lewis, Philip Champion, Ross C. Harvey; Millicent—A. C. Shepherd; Gladstone Women's—Mrs. Campbell, Mrs. Venning; Kyhybolite—A. Greive, S. B. Castine, W. Sanders, M. Crunkhorn; Netherton—A. C. R. Eglinton; Boolgun—Herbert Castle; Beetaloo Valley—H. T. Head, F. Bartrum, A. T. Brown; Black Springs—P. Copestake; Kulyan—R. E. R. Lang; Penwortham—Blackett, Chynoweth; Pinkawillinie—W. F. Freeth, A. Heath, H. Heath, R. Ballantyne, W. Vivian, Warc; Palalie—G. M. Mayhew, L. Wilks, H. Luestner, A. E. Place; Blyth—Wm. Brereton, P. Tonkin; Mount Barker—R. F. Edwards, K. M. Bowen; Pinnaroo—Geo. Lloyd; Pinnaroo Women's—Mrs. N. O'Loughlin; Kanni—J. Platten, J. Platten, jun., V. T. Platten, R. Picard, G. Gregory, E. Schultz; Miltalie—J. T. Forth; Riverton—E. Travers, A. O. Thomas; Brinkworth—E. R. Ottens; Truro—E. B. Schilling, P. S. Klemm, O. Habel, H. Habel, M. Habel; Balaklava—A. S. Smart; Lyndoch—J. C. Daly; Hartley—Wm. Yeates; Laura—H. F. Klemm, A. Klemm; Nelshaby—G. Verwort, J. H. Franks, S. Turner; Currency Creek—W. A. Robinson; Talia—W. Thomson, F. P. Thomson, B. Hardy, R. Lewis, M. Cameron; Nunjikompta—Jas. Davies, Edwin Gum; Wilkawatt Women's—Mrs. H. L. Billing; Bute—E. W. Bettess, J. A. Otte; Rapid Bay—Frank Macrow, R. Hooper; Keith—A. W. Dellow, C. D. Ellis; Coorabie—E. H. Attick, E. H. Johns, T. F. Gurney, Roy Gurney; Alawoona—A. G. Pengilly, L. Smith; Yandiah, E. R. Speed; Millendilla—F. Bartel; Nelshaby Women's—Mrs. W. E. Martens, Mrs. L. C. Roberts, Mrs. R. L. Smith, Mrs. J. Turner, Mrs. W. Lock, Mrs. H. Burford; Kapinnie—G. R. Rieman.

Number of Branches, 297; total number of members, 8,216.



## DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported on August 1st, 1930:—

**BUTTER.**—The outlook for the dairying industry has shown a vast improvement during the past few weeks, for, owing to the good general rains that we received throughout July, the pastures have come along rapidly, and the importation of butter from the Eastern States has ceased. The growing conditions have been almost ideal, and consequently with production coming along rapidly there should shortly be a surplus of butter for export. Values have eased during the last week or two, and with London markets weak further easings must take place to export parity, and rates would then steady according to the values obtainable by overseas trade. Meanwhile steadily increasing supplies of cream and butter are coming to hand, and the quality is of a high standard. (Choicest creamery fresh butter in prints, 1s. 9d. per lb.; second and third grades, 1s. 6d. (these prices are subject to the stabilisation levies); best separators, 1s. 5d. to 1s. 6d.; well-conditioned store and collectors, 1s. 2½d. to 1s. 3½d.)

**EGGS.**—As usual at this time of the year, quantities are showing an increase each week, and as the surplus is now a considerable one, it will be taken up by pulpers, and exporters values have come back. However, it is now expected that pulpers and picklers will be operating freely, so that consignments will be kept clear. Ordinary country eggs, hen 8d. per dozen, duck 9d. per dozen; selected, tested, and infertile higher.

**CHEESE.**—The conditions in the South-East are good, and it is expected that the production of cheese will be greater than last season. So far consignments received have met with ready clearance to local and Western Australian buyers, and the market is steady. New makes, large to loaf, 9½d. to 10½d. per lb. Semi-matured and matured, to 1s. 1d. per lb.

**ALMONDS.**—After a period of dullness in the market, there was an improved demand in this State for all classes of almonds, and stocks have now been considerably reduced. Kernels also have been meeting with better demand, so that the quantities held are only light. Brandis, 7½d. to 8½d.; mixed softshells, 6½d. to 7d.; hardshells, 4d.; kernels, 1s. 7½d. per lb.

**HONEY.**—This commodity has not been selling nearly so freely this year as in other seasons, and is due to the fact that interstate buyers have been carrying stocks from the previous year, and have, therefore, not needed the usual quantities from South Australia. Sales have been limited during the past month or two to prime clear extracted, and lower grade lines are neglected. Prime clear extracted in liquid condition, 4½d. to 5d.; best quality candied lots, 4½d. to 4¾d. per lb.; second grade honey, 3d. to 3½d. per lb.

**BEEWAX.**—No alteration to report; 1s. 5d. to 1s. 5½d. per lb., according to quality.

**BACON.**—There are ample stocks of bacon held by all curers at present, as supplies of live hogs to the markets have been good, although the turnover is being steadily maintained in bacon, the demand for hams is somewhat slow. Best local sides, 11½d. to 12½d.; best local factory-cured middles, 1s. to 1s. 1d.; large, 10d.; local rolls, 9½d. to 10½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 5d.; local hams, 1s. to 1s. 1d.; "Sugar Cane" brand lard, in packets, 11d., in bulk, 10d. per lb.; local lard, 9d. per lb. in prints.

**LIVE POULTRY.**—The demand for all classes of poultry has maintained better than was expected, and although our sales each week have been well supplied with consignments from the country, and also suburban yards, yet the demand has been sufficient to absorb all lots at satisfactory prices. The special sales of purebred birds held during the month have also met with acceptance, both to buyers and sellers, and the rates obtained were good and commensurate with the standard of the birds. We advise consigning. Crates loaned on application. The following prices ruled at Friday's sale:—Prime roosters, 4s. 6d. to 5s. 9d.; nice-conditioned cockerels, 3s. 6d. to 4s. 3d.; fair-conditioned cockerels, 2s. 6d. to 3s.; chickens lower. Heavy weight hens, 3s. 3d. to 4s. 6d.; medium hens, 2s. 6d. to 3s. 1d.; light hens, 2s. to 2s. 4d.; couple of pens of weedy sorts lower. Geese, 4s. 6d. to 6s. 9d.; prime Muscovy drakes, 3s. 9d. to 5s.; ducks, good conditioned, 2s. 9d. to 3s. 5d.; ducks, fair condition, 2s. 3d. to 2s. 7d.; ducklings lower. Turkeys, good to prime condition, 9½d. to 11½d. per lb. live weight; turkeys, fair condition, 7½d. to 8½d. per lb. live weight; turkeys, fattening sorts lower. Pigeons, 7d. each.

**POTATOES.**—Best South-Easterns, 8s. 6d. per cwt.

**ONIONS.**—Best brown, 6s. per cwt.







## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of July, 1930, also the average precipitation to the end of July, and the average annual rainfall.

| Station.                   | For July, 1930. | To end July, 1930. | Av'ge to end July. | Av'ge Annual Rain-fall. | Station.              | For July, 1930. | To end July, 1930. | Av'ge to end July. | Av'ge Annual Rain-fall. |
|----------------------------|-----------------|--------------------|--------------------|-------------------------|-----------------------|-----------------|--------------------|--------------------|-------------------------|
| FAR NORTH AND UPPER NORTH. |                 |                    |                    |                         | LOWER NORTH—continued |                 |                    |                    |                         |
| Oodnadatta .....           | 0-09            | 1-12               | 3-04               | 4-78                    | Brinkworth ....       | 1-89            | 5-55               | 8-73               | 16-01                   |
| Marree .....               | 0-09            | 2-99               | 3-48               | 5-92                    | Blyth .....           | 1-40            | 4-80               | 9-53               | 16-94                   |
| Farina .....               | 0-41            | 3-27               | 4-05               | 6-53                    | Clare .....           | 2-49            | 9-63               | 14-09              | 24-67                   |
| Copley .....               | 1-07            | 4-17               | 4-90               | 8-04                    | Mintaro .....         | 2-77            | 8-73               | 12-81              | 23-51                   |
| Beltana .....              | 1-05            | 3-66               | 5-22               | 8-68                    | Watervale .....       | 2-33            | 7-52               | 15-24              | 27-24                   |
| Blinman .....              | 1-19            | 4-00               | 7-38               | 12-12                   | Auburn .....          | 2-99            | 7-60               | 13-69              | 24-12                   |
| Hookina .....              | 1-66            | 3-61               | 6-80               | 11-85                   | Hoyleton .....        | 1-37            | 4-19               | 9-79               | 17-56                   |
| Hawker .....               | 1-78            | 3-82               | 7-17               | 12-43                   | Balaklava .....       | 1-71            | 4-38               | 8-91               | 15-99                   |
| Wilson .....               | 1-63            | 3-79               | 6-94               | 12-01                   | Port Wakefield ..     | 1-41            | 3-59               | 7-89               | 13-08                   |
| Gordon .....               | 1-73            | 4-43               | 6-23               | 10-89                   | Terowie .....         | 1-41            | 2-29               | 7-30               | 13-58                   |
| Quorn .....                | 1-80            | 3-38               | 7-63               | 13-60                   | Yarcowie .....        | 1-46            | 3-01               | 7-65               | 13-83                   |
| Port Augusta ....          | 1-74            | 2-74               | 5-50               | 9-50                    | Hallett .....         | 1-61            | 4-41               | 8-94               | 16-55                   |
| Bruce .....                | 1-88            | 3-65               | 5-53               | 10-10                   | Mount Bryan ..        | 2-30            | 4-73               | 9-13               | 16-87                   |
| Hammond .....              | 1-57            | 2-67               | 6-40               | 11-54                   | Burra .....           | 2-12            | 4-76               | 10-12              | 18-00                   |
| Wilmington .....           | 2-31            | 4-27               | 10-18              | 17-78                   | Farrell's Flat ..     | 2-03            | 4-91               | 10-47              | 18-82                   |
| Willowie .....             | 2-41            | 6-70               | 6-75               | 12-27                   |                       |                 |                    |                    |                         |
| Melrose .....              | 2-70            | 6-09               | 13-57              | 23-15                   | WEST OF MURRAY RANGE. |                 |                    |                    |                         |
| Booleroo Centre...         | 2-06            | 6-10               | 8-61               | 15-41                   | Manoora .....         | 2-23            | 6-40               | 10-20              | 18-97                   |
| Port Germein ....          | 2-31            | 4-47               | 7-13               | 12-56                   | Saddleworth ....      | 2-09            | 7-31               | 11-06              | 19-65                   |
| Wirrabara .....            | 2-46            | 5-10               | 11-01              | 19-47                   | Marrabel .....        | 3-15            | 6-87               | 11-02              | 19-92                   |
| Appila .....               | 1-52            | 3-90               | 8-20               | 15-01                   | Riverton .....        | 2-74            | 5-96               | 11-75              | 20-86                   |
| Craddock .....             | 1-36            | 4-40               | 6-29               | 11-00                   | Tarlee .....          | 3-10            | 6-23               | 10-12              | 18-16                   |
| Carrieton .....            | 1-80            | 4-73               | 6-97               | 12-47                   | Stockport .....       | 2-83            | 6-15               | 9-28               | 16-88                   |
| Johnburg .....             | 1-37            | 3-55               | 5-79               | 10-69                   | Hamley Bridge ..      | 2-85            | 5-72               | 9-40               | 16-67                   |
| Eurelia .....              | 1-55            | 3-05               | 7-17               | 13-14                   | Kapunda .....         | 2-87            | 6-62               | 11-19              | 19-92                   |
| Orroroo .....              | 2-15            | 3-48               | 7-66               | 13-36                   | Freeling .....        | 2-98            | 6-10               | 10-02              | 18-03                   |
| Nackara .....              | 1-42            | 3-06               | 6-60               | 11-71                   | Greenock .....        | 3-79            | 7-82               | 11-95              | 21-76                   |
| Black Rook .....           | 1-58            | 3-17               | 7-05               | 12-57                   | Truro .....           | 3-54            | 6-29               | 11-24              | 20-21                   |
| Oodlawirra .....           | 1-73            | 3-93               | —                  | *                       | Stockwell .....       | 3-84            | 7-55               | 11-27              | 20-30                   |
| Peterborough ....          | 1-81            | 3-11               | 7-35               | 13-40                   | Nuriootpa .....       | 3-52            | 7-58               | 11-60              | 20-74                   |
| Yongala .....              | 2-27            | 3-63               | 7-83               | 14-57                   | Angaston .....        | 3-59            | 7-81               | 12-64              | 22-58                   |
|                            |                 |                    |                    |                         | Tanunda .....         | 4-20            | 7-55               | 12-67              | 22-20                   |
| NORTH-EAST.                |                 |                    |                    |                         | Lyndoch .....         | 5-07            | 8-46               | 13-20              | 23-71                   |
| Yunta .....                | 0-84            | 1-93               | 4-96               | 8-53                    | Williamstown...       | 5-77            | 10-16              | 16-16              | 27-84                   |
| Waukaringa .....           | 0-87            | 2-47               | 4-71               | 8-38                    |                       |                 |                    |                    |                         |
| Mannahill .....            | 0-58            | 4-31               | 4-76               | 8-39                    | ADELAIDE PLAINS.      |                 |                    |                    |                         |
| Cockburn .....             | 0-62            | 2-28               | 4-75               | 8-04                    | Owen .....            | 3-03            | 6-16               | —                  | *14-22                  |
| Broken Hill, N.S.W.        | 0-51            | 3-64               | 5-74               | 9-71                    | Mallala .....         | 2-94            | 5-63               | 9-59               | 16-77                   |
|                            |                 |                    |                    |                         | Roseworthy ....       | 3-46            | 5-84               | 9-79               | 17-46                   |
| LOWER NORTH.               |                 |                    |                    |                         | Gawler .....          | 3-52            | 6-54               | 11-09              | 19-14                   |
| Port Pirie .....           | 2-10            | 3-58               | 7-71               | 13-38                   | Two Wells .....       | 2-91            | 5-56               | 9-39               | 15-88                   |
| Port Broughton ..          | 2-45            | 4-77               | 8-23               | 14-08                   | Virginia .....        | 3-12            | 6-03               | 10-07              | 17-30                   |
| Bute .....                 | 2-02            | 5-05               | 9-09               | 15-56                   | Smithfield .....      | 3-20            | 6-62               | 9-85               | 17-58                   |
| Laura .....                | 1-93            | 4-73               | 10-13              | 18-20                   | Salisbury .....       | 3-41            | 6-94               | 10-97              | 18-63                   |
| Caltowie .....             | 1-88            | 4-50               | 9-20               | 16-94                   | Adelaide .....        | 4-22            | 7-94               | 12-68              | 21-16                   |
| Jamestown .....            | 2-32            | 5-10               | 9-73               | 17-95                   | Glen Osmond ..        | 5-17            | 9-21               | 15-64              | 26-19                   |
| Gladstone .....            | 1-90            | 4-34               | 9-01               | 16-44                   | Magill .....          | 4-71            | 9-48               | 15-30              | 25-77                   |
| Crystal Brook ....         | 2-14            | 4-57               | 8-92               | 15-89                   |                       |                 |                    |                    |                         |
| Georgetown .....           | 2-08            | 5-58               | 10-39              | 18-53                   | MOUNT LOFTY RANGES.   |                 |                    |                    |                         |
| Narridy .....              | 1-99            | 5-17               | 9-15               | 15-99                   | Teatree Gully...      | 4-31            | 8-38               | 16-15              | 27-70                   |
| Redhill .....              | 2-51            | 5-24               | 9-53               | 17-02                   | Stirling West ..      | 10-82           | 18-03              | 27-87              | 47-04                   |
| Spalding .....             | 1-59            | 3-91               | 10-30              | 19-53                   | Uraidla .....         | 8-68            | 15-08              | 26-34              | 44-38                   |
| Gulnare .....              | 2-44            | 5-01               | 10-20              | 18-92                   | Clarendon .....       | 6-28            | 11-94              | 19-65              | 33-03                   |
| Yaaka .....                | 1-82            | 5-53               | 8-56               | 15-40                   | Morphett Vale ..      | 4-67            | 9-29               | 13-49              | 22-78                   |
| Koolunga .....             | 1-80            | 4-24               | 8-74               | 15-61                   | Noarlunga .....       | 3-86            | 7-73               | 12-34              | 20-49                   |
| Snowtown .....             | 1-82            | 4-61               | 8-94               | 15-78                   | Willunga .....        | 4-63            | 10-03              | 15-77              | 26-07                   |



| Station.                         | For<br>July,<br>1930. | To<br>end<br>July,<br>1930 | Av'ge<br>to end<br>July. | Av'ge<br>Annual<br>Rain-<br>fall. |
|----------------------------------|-----------------------|----------------------------|--------------------------|-----------------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                       |                            |                          |                                   |
| Aldinga .....                    | 3-83                  | 7-00                       | 12-29                    | 20-34                             |
| Myponga .....                    | 7-40                  | 12-50                      | 17-27                    | 29-62                             |
| Normanville .....                | 4-36                  | 7-98                       | 12-72                    | 20-75                             |
| Yankalilla .....                 | 4-36                  | 7-80                       | 14-16                    | 23-61                             |
| Mount Pleasant .....             | 4-71                  | 9-21                       | 15-67                    | 27-38                             |
| Birdwood .....                   | 5-84                  | 9-95                       | 16-77                    | 29-41                             |
| Gumbracha .....                  | 6-58                  | 11-65                      | 19-31                    | 33-54                             |
| Millbrook Reservoir .....        | 6-86                  | 11-88                      | 19-94                    | 36-18                             |
| Tweedvale .....                  | 7-91                  | 12-80                      | 20-86                    | 36-08                             |
| Woodside .....                   | 6-18                  | 10-69                      | 18-51                    | 32-47                             |
| Ambleside .....                  | 6-22                  | 11-88                      | 20-09                    | 35-09                             |
| Nairne .....                     | 4-64                  | 10-09                      | 16-28                    | 28-29                             |
| Mount Barker .....               | 6-13                  | 13-18                      | 18-25                    | 31-66                             |
| Echunga .....                    | 5-44                  | 11-54                      | 19-51                    | 33-35                             |
| Macclesfield .....               | 4-12                  | 10-07                      | 17-43                    | 30-72                             |
| Meadows .....                    | 5-59                  | 12-09                      | 21-03                    | 36-42                             |
| Strathalbyn .....                | 2-34                  | 6-18                       | 11-20                    | 19-43                             |
| <b>MURRAY FLATS AND VALLEY</b>   |                       |                            |                          |                                   |
| Meningie .....                   | 3-67                  | 6-57                       | 10-92                    | 18-52                             |
| Milang .....                     | 2-75                  | 5-39                       | 8-92                     | 15-13                             |
| Langhorne's Creek .....          | 2-95                  | 6-45                       | 8-32                     | 14-84                             |
| Wellington .....                 | 2-76                  | 5-46                       | 8-28                     | 14-67                             |
| Tailem Bend .....                | 2-49                  | 5-58                       | 7-80                     | 14-77                             |
| Murray Bridge .....              | 2-18                  | 4-23                       | 7-74                     | 13-84                             |
| Callington .....                 | 2-57                  | 5-36                       | 8-62                     | 15-40                             |
| Mannum .....                     | 1-68                  | 4-22                       | 6-68                     | 11-56                             |
| Palmer .....                     | 1-88                  | 4-56                       | 8-29                     | 15-59                             |
| Sedan .....                      | 1-31                  | 4-18                       | 6-86                     | 12-24                             |
| Swan Reach .....                 | 1-31                  | 3-22                       | 5-82                     | 10-77                             |
| Blanchetown .....                | 1-28                  | 2-98                       | 6-54                     | 11-24                             |
| Eudunda .....                    | 2-68                  | 5-95                       | 9-48                     | 17-19                             |
| Sutherlands .....                | 2-05                  | 4-01                       | 5-15                     | 10-87                             |
| Morgan .....                     | 1-64                  | 4-03                       | 4-95                     | 9-23                              |
| Waikerie .....                   | 1-49                  | 4-73                       | 5-18                     | 9-71                              |
| Overland Corner .....            | 1-31                  | 4-55                       | 5-76                     | 10-58                             |
| Loxton .....                     | 1-70                  | 4-71                       | 6-39                     | 11-80                             |
| Renmark .....                    | 1-25                  | 3-77                       | 5-61                     | 10-60                             |
| <b>WEST OF SPENCER'S GULF.</b>   |                       |                            |                          |                                   |
| Eucla .....                      | 0-46                  | 9-77                       | —                        | *                                 |
| Fowler's Bay .....               | 0-85                  | 3-08                       | 7-81                     | 11-85                             |
| Penong .....                     | 0-86                  | 2-64                       | 7-59                     | 12-12                             |
| Koonibba .....                   | 1-58                  | 3-56                       | —                        | *                                 |
| Denial Bay .....                 | 0-89                  | 3-68                       | 7-51                     | *11-56                            |
| Ceduna .....                     | 0-93                  | 3-74                       | 5-91                     | 9-92                              |
| Smoky Bay .....                  | 1-11                  | 2-47                       | 6-55                     | 10-61                             |
| Wirrulla .....                   | 2-34                  | 3-82                       | —                        | *                                 |
| Streaky Bay .....                | 1-96                  | 3-97                       | 9-60                     | 14-95                             |
| Talia .....                      | 2-53                  | 4-40                       | 8-64                     | 15-27                             |
| Port Elliston .....              | 2-11                  | 3-89                       | 10-40                    | 16-53                             |
| Port Lincoln .....               | 2-67                  | 6-14                       | 11-93                    | 19-50                             |
| Cummins .....                    | 2-71                  | 4-97                       | 10-29                    | 17-86                             |
| Yeelanna .....                   | 2-38                  | 4-11                       | 9-27                     | 16-12                             |
| Ungarra .....                    | 2-21                  | 5-96                       | 9-32                     | 16-85                             |
| Rudall .....                     | 2-11                  | 4-97                       | 7-31                     | *12-14                            |
| Darke's Peak .....               | 3-08                  | 5-20                       | 8-20                     | 15-13                             |
| Kimba .....                      | 2-18                  | 5-20                       | 6-58                     | *11-92                            |
| Kyanoutta .....                  | 2-38                  | —                          | —                        | 13-68                             |
| Minnipa .....                    | 2-71                  | 4-64                       | 8-52                     | 14-68                             |
| Tumby .....                      | 1-36                  | 4-88                       | 7-79                     | 14-22                             |

| Station.                             | For<br>July,<br>1930. | To<br>end<br>July,<br>1930. | Av'ge<br>to end<br>July. | Av'ge<br>Annual<br>Rain-<br>fall. |
|--------------------------------------|-----------------------|-----------------------------|--------------------------|-----------------------------------|
| <b>WEST OF SPENCER'S GULF—contd.</b> |                       |                             |                          |                                   |
| Carrow .....                         | 1-25                  | 3-54                        | 7-18                     | 13-47                             |
| Arno Bay .....                       | 2-01                  | 5-34                        | 6-97                     | 12-48                             |
| Cleve .....                          | 2-43                  | 5-84                        | 8-34                     | 14-63                             |
| Cowell .....                         | 0-94                  | 3-88                        | 6-53                     | 11-25                             |
| Miltalie .....                       | 1-69                  | 5-22                        | 7-85                     | 13-88                             |
| Chandada .....                       | 2-49                  | 5-18                        | —                        | —                                 |
| <b>YORKE PENINSULA.</b>              |                       |                             |                          |                                   |
| Walleroo .....                       | 1-93                  | 4-42                        | 8-62                     | 13-99                             |
| Kadina .....                         | 2-00                  | 4-54                        | 9-57                     | 15-77                             |
| Moonta .....                         | 2-13                  | 5-07                        | 9-39                     | 15-16                             |
| Paskeville .....                     | 1-75                  | 4-10                        | 9-17                     | 15-67                             |
| Maitland .....                       | 3-21                  | 6-75                        | 12-06                    | 20-03                             |
| Ardrossan .....                      | 2-10                  | 4-44                        | 8-23                     | 14-02                             |
| Port Victoria .....                  | 2-98                  | 5-84                        | 9-24                     | 15-41                             |
| Curramulka .....                     | 4-11                  | 7-13                        | 10-53                    | 17-98                             |
| Minlaton .....                       | 3-00                  | 6-02                        | 10-60                    | 17-98                             |
| Pt. Vincent .....                    | 3-06                  | 5-35                        | 8-29                     | 14-54                             |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawonna (8), Eucla (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

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|                            |                 | Aug.               | Sept. |                           |                 | Aug.               | Sept. |
| Alawoona                   | *               | —                  | —     | Edillilite                | *               | —                  | —     |
| Aldinga                    | *               | —                  | —     | Elbow Hill                | *               | 12                 | 9     |
| Allandale East             | 87              | 8                  | 5     | Eudunda                   | A.M.            | 4                  | 1     |
| Alma                       | †               | —                  | —     | Eurelia                   | A.M.            | 2                  | 13    |
| Amyton                     | *               | —                  | —     | Eurelia Women's           | A.M.            | 6                  | 3     |
| Angaston                   | *               | —                  | —     | Everard East              | 88              | —                  | —     |
| Appila                     | *               | —                  | —     | Farrell's Flat            | *               | 29                 | 26    |
| Appila-Yarrowie            | †               | —                  | 5     | Finniss                   | *               | —                  | —     |
| Artherton                  | *               | —                  | —     | Gawler River              | *               | —                  | —     |
| Ashbourne                  | *               | —                  | —     | Georgetown                | *               | 9                  | 6     |
| Auburn                     | *               | —                  | —     | Geranium                  | *               | 30                 | 27    |
| Auburn Women's             | *               | 29                 | —     | Gladstone                 | A.M.            | 8                  | 5     |
| Balaklava                  | *               | —                  | —     | Gladstone Women's         | *               | 8                  | 5     |
| Balhannah                  | A.M.            | —                  | —     | Glencoe                   | *               | 12                 | 9     |
| Barmora                    | *               | —                  | —     | Glossop                   | *               | —                  | —     |
| Beetaloo Valley            | A.M.            | —                  | —     | Goode                     | *               | 7                  | 11    |
| Belalie North              | 88              | 4                  | 8     | Goode Women's             | †               | —                  | —     |
| Belalie Women's            | 88              | —                  | —     | Green Patch               | A.M.            | 7                  | 4     |
| Berri                      | A.M.            | 6                  | 10    | Gulnare                   | *               | —                  | —     |
| Big Swamp                  | *               | —                  | —     | Guneracha                 | †               | 11                 | 8     |
| Blackheath                 | *               | 14                 | 11    | Halidon                   | *               | —                  | —     |
| Black Rock                 | A.M.            | —                  | —     | Hanson                    | *               | —                  | —     |
| Black Springs              | †               | 5                  | 2     | Hartley                   | A.M.            | 4                  | 3     |
| Blackwood                  | †               | 11                 | 8     | Hawker                    | *               | 12                 | 9     |
| Block E                    | †               | —                  | —     | Hookina                   | *               | —                  | —     |
| Blyth                      | †               | 15                 | 19    | Hoyleton                  | *               | 18                 | 15    |
| Booleroo Centre            | †               | 8                  | 5     | Inman Valley              | A.M.            | 21                 | 18    |
| Booigun                    | †               | 7                  | 3     | Ironbank                  | †               | —                  | —     |
| Boors Plains and Thrington | *               | —                  | —     | Jamestown                 | †               | 25                 | 22    |
| Borrika                    | *               | —                  | —     | Kalangadoo Women's        | †               | 9                  | 13    |
| Bowhill                    | †               | 4                  | 8     | Kalangadoo                | *               | 12                 | 9     |
| Brentwood                  | †               | 7                  | 4     | Kalyan                    | †               | 20                 | 17    |
| Brinkley                   | 92              | 6                  | 3     | Kangarilla                | †               | —                  | —     |
| Brinkworth                 | 89              | 4                  | 8     | Kangarilla Women's        | *               | 21                 | 18    |
| Brownlow                   | 92              | 6                  | —     | Kanmantoo                 | *               | —                  | —     |
| Buchanan                   | †               | —                  | —     | Kanni                     | A.M.            | —                  | —     |
| Bugle                      | A.M.            | 12                 | 9     | Kapinnie                  | †               | —                  | —     |
| Bundaleer Springs          | *               | —                  | —     | Kapunda                   | †               | 8                  | 12    |
| Bunora                     | *               | 9                  | 8     | Karcultaby                | *               | —                  | —     |
| Bute                       | *               | 21                 | 18    | Karoonda                  | *               | 6                  | 10    |
| Butler                     | *               | —                  | —     | Keith                     | †               | 7                  | 4     |
| Calca                      | *               | —                  | —     | Kelly                     | †               | 9                  | 6     |
| Cadell                     | *               | —                  | —     | Ki Ki                     | *               | —                  | —     |
| Calph                      | †               | 5                  | 2     | Kilkerran                 | 90              | 7                  | 4     |
| Canowie Belt               | *               | —                  | —     | Kongorong                 | *               | 4                  | 8     |
| Caralue                    | *               | 6                  | 3     | Koolunga                  | 88              | 5                  | 2     |
| Carrow                     | *               | 6                  | 3     | Koonibba                  | *               | 7                  | 4     |
| Chandada                   | †               | 15                 | 19    | Koonunga                  | †               | 5                  | 2     |
| Charra                     | †               | —                  | —     | Koppio                    | *               | 4                  | 8     |
| Cherry Gardens             | †               | 2                  | 6     | Kringin                   | *               | 11                 | 8     |
| Claifield                  | A.M.            | —                  | —     | Kulkawirra                | †               | 5                  | 9     |
| Clare                      | †               | —                  | —     | Kybybolite                | †               | 7                  | 4     |
| Clarendon                  | †               | —                  | —     | Lameroo                   | A.M.            | 9                  | 6     |
| Cleve                      | A.M.            | 7                  | 4     | Langhorne's Creek         | *               | 6                  | 3     |
| Cobdogla                   | *               | —                  | —     | Laura                     | *               | 9                  | 6     |
| Cullie                     | *               | —                  | —     | Laura Bay                 | 91              | —                  | —     |
| Colton                     | *               | —                  | —     | Lenswood and Forest Range | †               | —                  | —     |
| Coomandook                 | *               | 29                 | 26    | Light's Pass              | *               | —                  | —     |
| Coonalpyne                 | *               | —                  | —     | Lipson                    | *               | 9                  | 6     |
| Coonawarra                 | 88              | 12                 | 11    | Lone Gum and Monash       | *               | 6                  | 3     |
| Coorable                   | *               | —                  | —     | Lone Pine                 | *               | —                  | —     |
| Copeville                  | †               | —                  | —     | Longwood                  | †               | —                  | —     |
| Coulta                     | *               | —                  | —     | Lowbank                   | †               | 6                  | 3     |
| Craddock                   | *               | —                  | —     | Loxton                    | *               | 8                  | 12    |
| Cungena                    | A.M.            | —                  | —     | Lucindale                 | A.M.            | —                  | —     |
| Currency Creek             | A.M.            | 11                 | 8     | Lyndoch                   | A.M.            | —                  | —     |
| Cygnat River               | *               | —                  | —     | McLaren Flat              | †               | —                  | 11    |
| Darko's Peak               | *               | —                  | —     | MacGillivray              | *               | 5                  | 2     |
| Dudley                     | *               | —                  | —     | Mallala                   | *               | 18                 | 15    |
|                            |                 |                    |       | Maltee                    | *               | 7                  | 4     |



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| Mangalo .....              | *               | —                  | —     | Roberts and Verran .....     | 91              | —                  | —     |
| Mannanarie .....           | *               | 7                  | 4     | Rockwood .....               | †               | 4                  | 1     |
| Marama .....               | A.M.            | 5                  | —     | Rosedale .....               | †               | —                  | —     |
| Meadows .....              | *               | 6                  | 3     | Roseworthy .....             | †               | —                  | —     |
| Meribah .....              | †               | 11                 | 8     | Rosy Pine .....              | *               | —                  | —     |
| Milang .....               | †               | 9                  | 18    | Rudall .....                 | *               | 5                  | 2     |
| Milendilla .....           | A.M.            | 4                  | 8     | Saddleworth .....            | *               | 5                  | 5     |
| Millicent .....            | †               | 29                 | 26    | Saddleworth Women's .....    | †               | 8                  | 2     |
| Millicent Women's .....    | †               | —                  | —     | Salisbury .....              | †               | 12                 | 9     |
| Miltalle .....             | A.M.            | —                  | 6     | Salt Creek .....             | *               | —                  | —     |
| Mindarie .....             | *               | 1                  | 5     | Sandalwood .....             | †               | —                  | —     |
| Minnipa .....              | †               | —                  | —     | Scott's Bottom .....         | †               | 9                  | 6     |
| Modbury .....              | †               | —                  | —     | Shoal Bay .....              | A.M.            | 5                  | 2     |
| Monarto South .....        | †               | —                  | —     | Smoky Bay .....              | A.M.            | —                  | —     |
| Moonta .....               | †               | —                  | —     | Snowtown .....               | †               | 8                  | 12    |
| Moorlands .....            | †               | 6                  | 10    | South Kilkerran .....        | †               | 5                  | 2     |
| Moorook .....              | †               | —                  | —     | Spalding .....               | †               | —                  | —     |
| Morchar .....              | †               | 8                  | 5     | Springton .....              | †               | 6                  | 3     |
| Morphett Vale .....        | †               | —                  | —     | Stirling .....               | *               | —                  | —     |
| Mount Barker .....         | †               | 6                  | 3     | Stockport .....              | †               | —                  | —     |
| Mount Bryan .....          | A.M.            | —                  | —     | Strathalbyn .....            | A.M.            | —                  | —     |
| Mount Compass .....        | A.M.            | —                  | —     | Streaky Bay .....            | †               | 22                 | 26    |
| Mount Gambier .....        | A.M.            | 8                  | 12    | Tallem Bend .....            | †               | 14                 | 11    |
| Mount Hope .....           | 91              | 5                  | 2     | Talla .....                  | †               | 30                 | 27    |
| Mount Pleasant .....       | A.M.            | —                  | —     | Tantanoola .....             | A.M.            | 2                  | 6     |
| Mount Remarkable .....     | *               | —                  | —     | Taplan .....                 | *               | 5                  | 2     |
| Mount Schank .....         | *               | —                  | —     | Taragoro .....               | †               | 7                  | 4     |
| Mudamuckla .....           | 91              | 9                  | 13    | Tarowie .....                | †               | —                  | —     |
| Mundalla .....             | †               | —                  | —     | Tarlee .....                 | †               | 19                 | 9     |
| Murray Bridge .....        | †               | 20                 | 10    | Tatara .....                 | †               | —                  | —     |
| Murraytown .....           | †               | 9                  | 6     | Thrington .....              | †               | —                  | —     |
| Myponga .....              | †               | 28                 | 24    | Tintinara .....              | †               | 30                 | 27    |
| Myra .....                 | *               | 6                  | 3     | Truro .....                  | †               | 11                 | 34    |
| Nantawarra .....           | †               | 7                  | 4     | Tulkineara .....             | †               | 7                  | 11    |
| Naracoorte .....           | †               | 9                  | 13    | Tweedvale .....              | A.M.            | 7                  | 11    |
| Narridy .....              | †               | 7                  | 4     | Two Wells .....              | *               | —                  | —     |
| Narrung .....              | †               | —                  | —     | Ungarra .....                | *               | 14                 | 11    |
| Nelshaby .....             | †               | —                  | —     | Uraldia and Summertown ..... | *               | —                  | —     |
| Netherton .....            | †               | 6                  | 3     | Velch .....                  | *               | —                  | —     |
| New Residence .....        | †               | —                  | —     | Virginia .....               | *               | —                  | —     |
| North Booborowie .....     | †               | 4                  | 8     | Walkerie .....               | *               | 8                  | 12    |
| Nunjilkompta .....         | †               | 7                  | 4     | Wanbi .....                  | *               | 27                 | 24    |
| Nunkeri .....              | †               | 6                  | 3     | Wandearah .....              | *               | 12                 | 1     |
| O'Loughlin .....           | †               | 11                 | 8     | Warcoowie .....              | A.M.            | —                  | 9     |
| Orroroo .....              | †               | —                  | —     | Warramboo .....              | †               | 5                  | 2     |
| Overland Corner .....      | A.M.            | 5                  | 2     | Wasleys .....                | †               | 14                 | 11    |
| Owen .....                 | *               | 8                  | 5     | Wasleys Women's .....        | †               | 7                  | 4     |
| Parilla .....              | *               | —                  | —     | Watervale .....              | †               | —                  | —     |
| Parilla Well .....         | †               | 26                 | 30    | Wauratiee .....              | †               | 5                  | 2     |
| Parilla Well Women's ..... | †               | 26                 | 30    | Weavers .....                | †               | 11                 | 8     |
| Parrakie .....             | †               | —                  | —     | Wepowie .....                | †               | 14                 | 8     |
| Paruna .....               | A.M.            | 6                  | 3     | White's River .....          | †               | 12                 | 9     |
| Paskeville .....           | A.M.            | 5                  | 2     | Whyte-Yarcoowie .....        | *               | —                  | —     |
| Pata .....                 | *               | 1                  | 5     | Wilkawatt Women's .....      | 94              | 19                 | —     |
| Penneshaw .....            | †               | —                  | —     | Williamstown Women's .....   | A.M.            | 6                  | 3     |
| Penola .....               | A.M.            | 2                  | 6     | Williamstown .....           | *               | —                  | —     |
| Penwortham .....           | †               | 7                  | 4     | Willowie .....               | *               | 6                  | 3     |
| Petersville .....          | A.M.            | 5                  | 2     | Wilmington .....             | A.M.            | 19                 | 16    |
| Petina .....               | A.M.            | 23                 | 27    | Windsor .....                | †               | —                  | —     |
| Pinbong .....              | A.M.            | —                  | —     | Wirrabara .....              | *               | —                  | —     |
| Pinkawillille .....        | 91              | —                  | —     | Wirrilla .....               | *               | 9                  | 6     |
| Pinnaroo .....             | †               | —                  | —     | Wirrulla .....               | 92              | 20                 | 17    |
| Pinnaroo Women's .....     | †               | 1                  | 5     | Wolseley .....               | A.M.            | 11                 | 8     |
| Poochera .....             | †               | —                  | —     | Wudinna .....                | 92              | —                  | —     |
| Port Elliot .....          | 94              | —                  | —     | Wynarka .....                | *               | —                  | —     |
| Pygery .....               | †               | 2                  | 6     | Yacka .....                  | *               | —                  | —     |
| Quorn .....                | †               | 6                  | 3     | Yadnarie .....               | 92              | 5                  | 2     |
| Rameo .....                | †               | 4                  | 8     | Yallunda Flat .....          | †               | —                  | —     |
| Rapid Bay .....            | *               | 14                 | 11    | Yandiah .....                | †               | 8                  | —     |
| Redhill .....              | †               | 5                  | —     | Yaninee .....                | †               | —                  | —     |
| Rendelsham .....           | †               | 5                  | 2     | Yantanable .....             | 92              | —                  | —     |
| Renmark .....              | †               | —                  | —     | Yeeelanna .....              | *               | 6                  | 3     |
| Rhyrie .....               | *               | —                  | —     | Yorketown-Melville .....     | *               | —                  | —     |
| Richman's Creek .....      | †               | 7                  | 4     | Younghusband .....           | *               | —                  | —     |
| Riverton .....             | †               | 11                 | 8     | Yurgo .....                  | 94              | —                  | —     |
| Riverton Women's .....     | †               | —                  | —     |                              |                 |                    |       |

\* No report received during the month of July. † Formal. ‡ Held over. R In recess.  
A.M. Annual meeting.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

##### ALLANDALE EAST.

June 6th.—Present: Nine members.

The meeting took the form of a Question Box. Mr. Laslett asked which fodder produced the most milk—hay or chaff. He had tried both, and found that his cows, when fed on chaff in boxes, wasted a good deal, and bolted the rest. He had fed them on long hay, Imbros Island oats, and though there was a certain amount of waste, the cows gave as much milk, and, taking into consideration the cost of cutting the hay into chaff, he thought it was just as well to feed the hay in the sheaf. Mr. Butler said that cows ate chaff greedily as a rule, but on account of their ruminating habits they still made full use of the fodder. It would take some experimenting to decide the question. "Is it possible to show a profit by top dressing land this year?" Mr. Parish said that land top dressed would carry an extra sheep per acre. The price of sheep and wool was low this year, but he still thought it would pay to top dress. The Chairman was of the same opinion. He had used more super this year than usual, which showed that he was willing to back his opinion with his cash. His pastures were better this year, especially a paddock of subterranean clover. This clover, once established and top dressed, would nearly double the carrying capacity of the land. Mr. Griffin favored rye grass, even in summer. After a shower of rain it would sprout, and provide a green bite when all else was dry. Mr. Kieselbach failed to see how top dressing would show a profit in a year like the present. It was said that the weight of wool was increased, but it would take an extra fleece of wool to pay for 1cwt. of super per acre. He had not practised top dressing, yet he had just sold some fat lambs for a good figure. Another questioner asked if it would pay to shear crossbred sheep twice a year. Mr. Earl, who asked the question, said that at crutching time this year the crossbreds were showing a fine staple of wool. He thought that if sheep were shorn in September and again about March, before the end of autumn, no injury should result to the sheep, and two wool cheques would be very acceptable in these lean times. It was stated that wool shorn in March would be light, but as wool was sold on a clean-scoured basis, the absence of yolk would be no detriment. Members seemed to agree that one fleece a year was all that could be expected. "In what months of the year are vetches injurious to stock, and if they affect sheep, in what way?" Mr. Laslett said that, as a rule, sheep would not eat enough of this

## SENTIMENT OR SECURITY?

**SENTIMENT** sometimes dominates the mind of the Testator when choosing an Executor, causing him to overlook that more important essential—**SECURITY**.

While the value of friendship to the family should not be under-rated, **READINESS** on the part of a friend or relative to serve as an Executor should not be mistaken for **ABILITY** to undertake these exacting duties.

Appointing a friend for sentimental reasons, regardless of his qualifications, frequently ends in disaster. **SECURITY** is the first essential, and is obtainable by appointing—

## ELDER'S

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weed to do them harm, provided there was grass in the paddock where they were running. Mr. Yateman said that if cattle or horses were put in a paddock where vetches were in seed, once they took to eating the seed they would keep on eating them, with very harmful effects. It was a good thing to bleed an animal that was so affected; in fact, he thought it was the only cure. Mr. Earl said his sheep were running in a paddock where there was a lot of vetch, but they did not eat it so long as there was other feed about. Mr. Butler said he had a small patch of it in his paddock, and he tried to dig it out, but the roots were tough and penetrated the soil to a great depth. It was suggested that the small patch might be covered with seaweed; this would kill all vegetation for a year or so, but after that time grass would grow again. The vetch plants flowered in September and October, and bore seed immediately afterwards.

#### COONAWARRA.

Meeting held June 4th. Present: Nine members. A discussion on "Pruning Apricot Trees" took place.

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

BELALIE NORTH (Average annual rainfall, 17.95in.).

June 5th.—Present: 14 members and visitors.

During the afternoon a pruning demonstration was given by Mr. J. B. Harris (District Horticultural Instructor). The evening meeting took the form of a social. Items were rendered by Miss E. Cummings, Messrs. W. J. Cummings, J. B. Harris, and E. J. Carmichael. Mr. H. C. Pritchard (General Secretary, Agricultural Bureau) addressed the meeting on topics connected with the Bureau. He then presented trophies won in the Seed Wheat Competition to Mr. F. L. Carmichael, first; Mr. A. D. Bray, second; and Champion (presented by Superphosphate Association) to Mr. F. L. Carmichael. Mr. Pritchard then presented Life Membership Certificates to Messrs. W. Cummings, sen., and A. H. Warner. The President then presented Mr. W. Cummings with a silver inkstand, suitably engraved, on behalf of the Branch in appreciation of his services for 19 years as Secretary.

BELALIE WOMEN'S (Average annual rainfall, 17.95in.).

Mrs. Moore presided over an attendance of 15 members, at the meeting of June 4th, which was held at Mrs. Haskard's homestead, when a Rose Pruning Demonstration was given by Mr. J. B. Harris (District Horticultural Instructor). On June 13th 12 members attended the annual meeting of the Gladstone Women's Branch.

#### EVERARD EAST.

The annual meeting was held on June 14th, and was attended by 11 members. The Hon. Secretary (Mr. F. Hughes) presented the annual report, and officers were elected for the ensuing year.

KOOLUNGA (Average annual rainfall, 15.61in.).

June 10th.—Present: Nine members.

Mr. A. H. Buchanan read a paper dealing with "Poultry," in the course of which he stated that farmers would have to take more trouble and care in selection of stock, or they would probably find it difficult to obtain a market for eggs. Referring to the grading of eggs, he said both the Red Comb Egg Association and the National Egg Company Ltd. were of great benefit to the suburban poultry keepers, inasmuch as the difference in price was as much as 10d. per dozen above the market. It seemed almost impossible for ordinary farmers to join such associations, because they could not comply with the regulations of housing and feeding and general equipment. The association also had a tendency to lower the prices of grades sold by farmers, which during the summer were not always f.a.q. The stock on most farms was so mixed and inbred that they deteriorated in size and health. He considered it far better to keep 100 young fowls and look after them well than to keep twice the number and half-starve them. In order to keep them young and up to the mark it was necessary to spend a lot of time in ringing their legs and to keep on culling out any that appeared to be unprofitable. Unless they were rung or marked, one never knew their age or when to put them out. For a farm flock, the White Leghorn and Black Orpingtons were very suitable breeds. Although the blacks did not lay so continuously, they laid when eggs were a good price, viz., April, May, and June. In order to keep the flock up to whatever number one could look after, one should rear about that number of chicks each year,



because 50 per cent. were generally roosters, and it was necessary to allow for deaths. The day-old chick business appealed to the farmer, because in getting the chicks already hatched the trouble seemed to be over, but it was not so. The advantages over hen hatching were that all the trouble came at once in looking after them, and not so many coops and pens were needed as with the hens, but unless procured from a reliable person, by getting them, say, in July, one would probably get a fair percentage from pullets' eggs, which might be very small and hard to rear, because the older hens did not lay until later. Anyone breeding chicks from their own hens had a fair idea as to the class of egg they would produce, and by grading the best eggs of standard weight there would be an improvement in the progeny. Where hatched with the incubator, the chicks were healthy, and did not get any disease from the hens, such as scaly leg, to which the heavy breeds seemed to be very subject, nor head lice, which was responsible for a large percentage of deaths in chicks with the hens. On examination with a magnifying glass of a chicken affected with head lice, one would find scores of very small lice, which appeared to be standing on the head and burrowing into the skull. If left, and the chick did not die, the lice changed to the amber-colored lice found later around the vent and tail feathers. When that was the case the chicks were worried right from the start, and consequently lost their vitality, and were more subject to colds and roup. The tick was largely responsible for losses during the summer, such as cholera and diarrhoea, caused by poison inserted into the body from the tick bites. The droppings during the night would act as a guide to the bird's health. If light green and whitish, it indicated cholera, and if colored throughout with pale pink and meat-like substance it indicated round worms or diarrhoea, especially in half-grown chicks, which became pale and lost feathers. There was also the gape worm, a Y-shaped or forked worm of about  $\frac{1}{16}$  in. to  $\frac{1}{8}$  in. in length. They attached themselves to the mucous membranes of the windpipe and sucked the blood. The bird continually opened its mouth and gasped for breath. A feather dipped in turpentine inserted in the windpipe and turned round would remove some of the worms, or sulphur blown down the throat would help to dislodge them. *Housing.*—In housing poultry there were three essentials—face the east so that the morning sun shone right in, thereby purifying the air and at the same time helping to keep in check vermin which bred rapidly in dark, ill-ventilated houses. The north, south, and west of the house should be wind proof, because nearly all cold weather and rain came from those quarters. (2) The house should have a good roof to keep the rain from soaking through and causing dampness under the birds; and (3) the floor should be higher than the surrounding ground to keep the floor dry. To ensure good ventilation it was a good plan to leave a space between the back wall and the roof. Houses should be kept as clean as possible at all times. In feeding laying hens, wet mash should be fed in the mornings to obtain the best results. He used bran and pollard in equal parts by measure, the bran being scalded and allowed to swell, and then sufficient pollard added to make it dry enough to stay in the mould of the hand. During winter months 1lb. of meatmeal and a little poultry spice added would be beneficial. As much greenfeed as one could give would help during summer.

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## LOWER-NORTH DISTRICT.

### (ADELAIDE TO FARRELL'S FLAT.)

BRINKWORTH (Average annual rainfall, 16.01in.).

June 9th.—Present: 20 members.

The matter of awarding a prize for the competitor securing highest number of points over a period of years in the local Seed Wheat Competition was discussed and referred to a committee for further consideration. The following paper, "Lowering Cost of Production with the Diesel Tractor," was read by Mr. B. Ottens. An animated discussion ensued:—"During the past few years it has been the aim of the Australian wheatgrower to increase wheat production and produce it at less cost. Owing to adverse seasons which have existed practically all over Australia during the last three or four years, farmers have found it impossible to produce more wheat, consequently their attention has been forced to cutting their production costs. Thousands of farmers throughout Australia have changed from horse power to motor power on their farms, and after having worked the tractors for several years, are fully convinced that tractors will work as cheaply, or, in most instances, much more cheaply than horses. Nevertheless, the cost of producing a crop of wheat is still too high. No doubt many farmers will say, 'We know it is, but how can we lower it?' One way to do so is to use a Diesel or semi-Diesel engine tractor, instead of horses, or a magneto and carburettor-fitted kerosine tractor. After having perused several dozen papers written on tractors or power farming which appeared in the *Journal of Agriculture* from time to time, I



find that the cost of seeding with a kerosine tractor, for fuel, oil, petrol, and grease, ranges from 10½d. to 1s. per acre, averaging 11d. per acre. After having worked a crude oil Diesel tractor for four seasons' seeding, and kept an accurate daily account of same, I will endeavor to show that a Diesel engined tractor will cut 11d. per acre in half. Four years' seeding with a 20 hoe combine and a set of light harrows attached are as follows:—Area, 1,968 acres; time 567 hours; 418galls. crude oil at 11d. per gallon, £19 3s. 2d.; 151galls kerosine at 1s. 3d. per gall, £9 8s. 9d.; 62galls. oil (engine and gearbox), at 5s. 3d. per gall., £6 15s. 6d.; grease at 1½d. per day, 56 days, 5s. 5d.; ignition fuses for starting, 7s. 2d.; total, £45 10s. This works out at 5½d. per acre, or 1s. 7d. per hour. (Adelaide prices would be over ½d. an acre less). As 5½d. is just half of 11d., the cost with a kerosine tractor would be £91, or a saving of £45 10s. for the Diesel tractor. Assuming that a farmer ploughs, harrows twice, cultivates twice, sows and reaps 480 acres per year, it will take him approximately 850 hours to do so, with a 15-30 horsepower tractor. As the Diesel motor saves 1s. 7d. per hour in 850 hours, it would mean a saving of £67 6s. per annum. Again, assuming that a tractor lasts for eight years, the Diesel tractor would save £67 6s. per year, and, adding compound interest at the rate of 6 per cent. on the first £67 6s., and each £67 6s. until the eighth year, it would mean a saving of £625 15s., or, in other words, over £100 more than the price of a new tractor. The saving in fuel and oil are not the only ways a Diesel engine cuts down costs, however, for there is also the replacing of spare parts to be considered. The total cost for engine replacements for three years' ploughing, cultivating, seeding, and reaping (no harrowing), covering an area of 4,183 acres, does not exceed £19 10s., or £6 10s. per annum. After this sum was spent, the motor was practically like new, because the main wearing parts had been replaced: that is, pistons, cylinder barrels, and rings. Another great feature of the crude oil Diesel tractor is its extraordinary reserve power and simplicity of construction, doing away with the trickiest part of most motors, namely, the magneto and spark plugs, also the carburettor. Even the valves, push rods, rocker arms, &c., are eliminated in the semi-Diesel. Perhaps some farmers say, 'Yes; they are noted for economy and durability, but are they reliable?' During the three years I have only lost one day's work owing to the breakage of a small part. Nowhere is reliability of such great importance as in aeroplanes, where pilot and passengers' lives depend upon reliability, and I think the fact that to-day there are huge air-liners built which depend solely on Diesel crude oil engines, speaks for itself."

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

KILKERRAN.

May 13th.—Present: 14 members and five visitors.

Mr. A. Sawade read a paper, "Farm Finance." Mr. Sawade said that because South Australia was a State which depended for its well-being almost wholly upon rural production, it naturally followed that the prosperity or otherwise of the rural producer would be reflected in the State as a whole. Some persons would no doubt say that drought conditions, prevailing during the past three or four years, combined with the falling prices of saleable produce, had been largely to blame for the farmers' difficulties. Nevertheless, Yorke Peninsula had not been hit so very severely by drought. In a few instances, yields had been slightly below the average, but in others they had been well above normal. Therefore, so far as their part of the State was concerned, they must look elsewhere for the cause, such as in the high cost of living, and in the high capitalisation of property. The economic factors that dominate the position might be grouped under two headings, namely:—(1) Mean cost of production; and (2) current prices offering for rural produce concerned. Over the latter, unfortunately, the producer had very little control. With regard to the former—costs of production—it could be said that while the farmer generally had an uneasy feeling of their immediate effects, he was rarely, if ever, able to define them with any degree of accuracy. Moreover, as such costs always varied from holding to holding, and from season to season, the value of any attempt to determine mean costs would largely depend on the number of units under observation, and upon the number of seasons over which the inquiry extended. During the past few years enormous prices had been realised for land in their district. It should be remembered that the mere fact of finding capital, whether personal or borrowed, to purchase and stock a farm was not the end of the story. That capital had to earn interest, which became the property of the owner if personal, or must be paid to his creditors, if borrowed. On a farm there was only one source from which interest could come, namely, the revenue of farm undertakings. It followed that net profits could only be claimed after interest claims on capital invested



had been fully satisfied. As an example, he took the case of a small farm of 600 acres, and assumed that the price paid was £30 per acre, that two-thirds of the farm would be cropped annually, and the remaining third fallowed, and that the area under crop would be half wheat and half barley. If wheat averaged 30bush. per acre at a price of 4s. and barley averaged 25bush. per acre and returned 2s. per bushel, with the invested capital at 5 per cent. it would give the following results:—Income—Wheat, 200 acres at 30bush. at 4s., £1,200; barley, 200 acres at 25bush. at 2s., £500; total income, £1,700. Expenses—Interest, 600 acres, £30, at 5 per cent., £900; interest farm plant, £1,500 at 10 per cent., £150; interest permanent improvements, £2,400 at 2½ per cent., £60; cornsacks, 11,000 at 9d., £137 5s.; kerosine and oil, 12 months' supply, £152 15s.; super, 20 tons at £5, £100; total expenses, £1,500; total income over expenses, £200. An animated discussion followed.

### WESTERN DISTRICT.

#### LAURA BAY.

Meeting held June 8th at Mr. W. W. Bowell's residence. Present: 11 members. An article, "The Blowfly Pest," was read by Mr. A. Dixon. This subject proved of timely interest. The blowfly is causing considerable trouble in this district.

#### MOUNT HOPE.

Meeting held June 10th. Present: Mr. T. Speed (Chairman) and 11 members. An instructive paper, "Stimulating Interest in the Work of the Agricultural Bureau," was read by Mr. L. Myers.

#### MUDAMUCKLA.

Meeting held June 14th. Present: 12 members. Mr. L. Watson read a paper, "The Uses of a Motor Truck on the Farm," which aroused an interesting discussion.

#### PINKAWILLINIE.

The monthly meeting was held at Mr. T. Hudson's residence. Mr. A. Lienert presided over an attendance of nine members. An excellent paper, "The Depression in the Wheat Industry, Its Cause, and the Probable Cure," was read by Mr. B. Hudson.

#### ROBERTS AND VERRAN.

June 11th.—Present: Eight members.

INCREASING PRODUCTION ON THE FARM.—Mr. H. Smith read the following paper:—"The first essential is to adopt a definite system of farm management. See that the stock and plant are as up to date as possible so that work can be done easily and well at the right time. On most farms in this district old and new land have to be cultivated. Always have early fallow, and see that it is well worked, free from stumps, etc., so that a good seedbed can be prepared. All weeds should be kept down, for which purpose sheep can be used between cultivations, and they will also help to pack the ground. Fallow should be worked when summer rains fall to conserve moisture and to prepare a good seedbed. Many farmers start to prepare the land at seeding time, which results in considerable loss. It means loss of early rains, a late seeding, and a late start with next year's fallow. Secondly, if the ground is in good heart, good seed and varieties suited to the district are important. All seed should be graded. In

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districts where the rainfall is from 12-14in., early and mid season varieties should be selected, and it is also well to sow oats on fallow so that a good hay cut can be obtained. A farm that can produce plenty of hay feed, &c., is usually one that is properly prepared, worked, and sown at the right time. Large implements are a great help in seeding operations; seed can be quickly sown after a good opening rain. Thirdly—Various classes of livestock are necessary to increase production. Only the best should be kept, and with all stock up to the standard there will never be any difficulty in selling any surplus animals." Discussing the paper, Mr. J. Pahl agreed that good methods and breeding combined with mixed farming were essential for increased production. Mr. S. Barber said it was essential to work the land as often as was possible. Mixed farming practices were essential. Sheep of the best suited breed should be kept, and good stock raised at all times. Mr. L. Gordon thought shallow working of land in this locality was essential. He worked his land with the rigid tyne implement in preference to the spring tyne. He advised raising crossbred lambs for mutton and freezing. Mr. C. Masters considered it was not necessary to work the land unless weeds appeared; much harm was done working loose soils too frequently.

#### WIRRULLA.

Meeting held May 8th. Present: Eight members. The Hon. Secretary read several items from the *Journal of Agriculture* dealing with seeding and depths of sowing, which brought forward a good discussion.

#### WUDINNA (Average annual rainfall, 13.68in.).

Meeting held May 7th. Present: 11 members. An instructive paper, "Farm Economy," was presented by Mr. A. Shephard. The meeting was held at the residence of Mr. W. Bartley. Supper was provided by the ladies.

#### YADNARIE (Average annual rainfall, 14.09in.).

Meeting held May 20th. Present: 14 members. Addresses were delivered by Messrs. E. L. Orchard and H. D. Adams, of the Department of Agriculture.

#### YANTANABIE.

May 1st.—Present: 17 members and three visitors.

The meeting took the form of a "Question Box." The following subjects were discussed:—"Which is the most suitable type of horse for the district?" Messrs. R. Hagett and F. Miller favored the Suffolk Punch sire, being fairly active, clean legged, and medium weight. "What is the best depth to sow in this district?" Members favored a 1in. seeding. "Is it advisable to harrow, and when?" Several speakers had found that the use of harrows after the wheat was up most advisable. Mr. H. Mathews reported having harrowed part of his crop twice. Weeds were destroyed in this way, and the crop returned 3bush. to the acre, whereas the crop not harrowed was not worth reaping. About three weeks after the crop appeared it should be harrowed. Mr. J. Karutz reported excellent results from this practice. Charlock was destroyed by the adoption of this plan.

### EASTERN DISTRICT.

#### (EAST OF MOUNT LOFTY RANGES.)

#### BRINKLEY.

Meeting held on June 11th. Present: 20 members and two visitors. The evening was devoted to a discussion of correspondence and local matters, also the annual social to be held on July 11th.

#### BROWNLOW.

May 7th.—Present: 16 members and five visitors.

THE HOME GARDEN.—Mr. C. Schiller read the following paper:—"The ground should be covered with 3in. or 4in. of old stable manure, and dusted with lime before being dug up from 6in. to 9in. deep. A good watering once or twice a week is best. The ground should be kept free from weeds and be loosened with a hand cultivator every three weeks. Liquid manure will be found of great benefit to the garden. Let the water stand 24 hours on the manure before applying it to the garden. Shorthorn carrot, Swedish Giant cabbage, Cauliflower Metropolitan, Drumhead lettuce, White Spine cucumber, Early Dwarf and Early Prolific tomatoes are some of the best varieties obtainable.

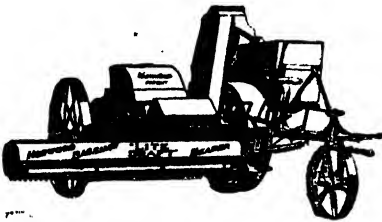


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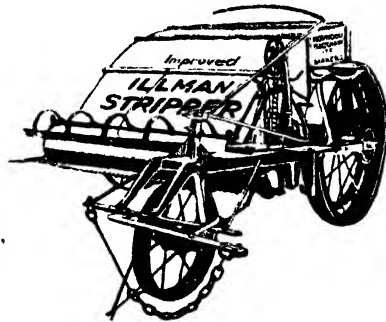


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**TULKINEARA.**

Meeting held June 11th. Present: 11 members and five visitors. Mr. A. H. Robin, B.V.Sc. (Government Veterinary Officer), addressed the meeting on the subject, "Ailments of Cows." Numerous questions were answered by Mr. Robin.

**WILKAWATT WOMEN'S** (Average annual rainfall, 16in. to 17in.).

The meeting of April 15th took the form of a social afternoon held at Mrs. Koch's residence. Items of interest were read to the members by Mrs. Koch. Afternoon tea was then served and a visit was made to the garden.

**YURGO.**

Meeting held April 30th. Present: 10 members. The meeting took the form of a "Question Box." Several questions were asked, each being followed by an interesting discussion.

**YURGO.**

Meeting held June 5th. Present: Nine members and two visitors. Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address relating to diseases in wheat crops. An instructive discussion followed.

**SOUTH AND HILLS DISTRICT.****PORT ELLIOT** (Average annual rainfall, 20.05in.).

May 17th.—Present: 18 members and two visitors.

**CONVERTING SCRUB COUNTRY INTO PASTURE LAND.**—The following paper was read by Mr. W. Drummond:—"There are various types of scrub country, but for the purposes of this paper our attention can be confined to three, namely—big timber, timber too large for rollers, and rollable scrub. The first mentioned is naturally the more slowly developed, because more work is entailed in bringing about the desired result. Probably the easiest and most effective way of handling very big timber is by cutting a frill with an axe into the sap-wood and immediately pouring in an arsenic solution. Timber treated in this manner dies gradually, commencing at the extremities of the lower limbs, and working inwards until eventually the top of the tree is reached. One advantage of this work is the lack of shoots. In country where big timber is not too thick this method should prove very successful. Country that has timber too large for the roller must be axed, and the only method that is to be considered at the outset is mullenising, i.e., to cut level with or, if possible, below the ground. It would probably pay to have the wood cut up into lengths ready to be handled as firewood. Timber handled in this way takes about 12 months to dry sufficiently to be used for firewood, and before the wood is cleared off, shoots are very vigorous. From the moment the wood is carted this country should be treated in the same manner as unhandled scrub that is readily rolled, apart from shoots, and for the sake of eradicating undergrowth. This course will be found desirable. From now on I propose to give both types of country the same treatment. In both cases, a good rolling well done is worth infinitely more than a badly-done job. The best time to roll is as soon after winter as possible, so that the roots of the scrub will receive a check at the time of rolling, and also at the time of burning through the shoots from 1ft. to 2ft. in height. A good burn helps tremendously in clearing undergrowth, as well as saving a large amount of work in the clearing up prior to ploughing, and having a large influence on subsequent cropping. Yaccas are a rather difficult proposition. Our practice has been to use a cutter, and with this and the aid of a sledge hammer to shear them off level with the ground, after which it is a comparatively easy matter to cart them into heaps and burn them. The first cultivation should be a good one, and I prefer using a heavy cultivator to a disc plough. If a disc plough is used to do a good job it means that undue strain is imposed on the implement when negotiating stumps, and consequently breakages and worn-out parts are continually requiring replacements. My main objection to this machine is its inability to perform even work on the bed of the ploughing. Heavy cultivators are available that will take through a large quantity of rubbish, and at the same time bring all roots of undergrowth to the surface of the ground instead of burying it as in the case of a disc plough. The ground should be left as fallow before cropping, thereby enabling several workings to be performed. This would make for the surer method of destroying the undergrowth, and enhance the chance of a better return from the subsequent crop. It may be argued that the shoots will become a menace, but this is one of the best times to give the stumps a severe check. Knocking the shoots off the stump with as much bark as possible during the autumn months will give the stump a better check than a burn, for it severs all the eyes from which new shoots spring, thereby



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### OF SOUTH AUSTRALIA.

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**All communications to be addressed:**

**Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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S. R. WHITFORD.

*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### Conferences.

Conferences of the Agricultural Bureau will be held as under:—

Murray Mallee, September 30th, at Alawoona (Secretary, Mr. B. L. Finney).

Eyre Peninsula (Eastern), October 6th, at Kimba (Secretary, Mr. M. Martin).

Eyre Peninsula, October 9th, at Wudinna (Secretary, Mr. C. A. Newbon). Altered from October 8th.

Non-irrigated Fruits Districts, November 4th, at Angaston (Secretary, Mr. K. Robinson).

Papers, questions, &c., for Conferences should be in the hands of the General Secretary, Agricultural Bureau, Adelaide, a fortnight before the respective dates stated above.

### List of Probable Dates of Country Shows During 1930.

| Name.                              | Secretary.          | Address.            | Approx. Date of Show. |
|------------------------------------|---------------------|---------------------|-----------------------|
| Eudunda . . . . .                  | C. R. Treloar . .   | Eudunda . . . . .   | September 24th        |
| Streaky Bay . . . . .              | R. A. Kay . . . .   | Streaky Bay . . . . | October 1st           |
| Blyth . . . . .                    | E. E. Eckermann .   | Blyth . . . . .     | October 1st           |
| Kapunda . . . . .                  | W. J. Tylor . . . . | Kapunda . . . . .   | October 4th           |
| Belalie (Jamestown) .              | L. M. W. Judell .   | Jamestown . . . .   | October 7th and 8th   |
| Great Flinders (Lipson)            | C. J. Partington .  | Lipson . . . . .    | October 8th           |
| Loxton . . . . .                   | J. M. Smart . . . . | Loxton . . . . .    | October 8th           |
| Lameroo . . . . .                  | H. H. Perrin . . .  | Lameroo . . . . .   | October 8th           |
| Tarlee . . . . .                   | H. E. Reed . . . .  | Tarlee . . . . .    | October 8th           |
| Wooroora (Tarlee) . .              | A. E. Reed . . . .  | Riverton . . . . .  | October 10th          |
| Pinnaroo . . . . .                 | J. H. Dewhirst . .  | Pinnaroo . . . . .  | October 15th          |
| Clare . . . . .                    | F. W. Knappstein .  | Clare . . . . .     | October 18th          |
| Central Yorke Penin.<br>(Minlaton) | D. M. S. Davies . . | Minlaton . . . . .  | October 22nd          |
| Mount Gambier . . . .              | H. L. Kennedy . . . | Mount Gambier . . . | October 22nd and 23rd |
| Tatiara (Bordertown)               | A. F. Baker . . . . | Bordertown . . . .  | October 29th and 30th |

*Secretaries of Show Societies are invited to advise the Editor of the dates of their Shows.*

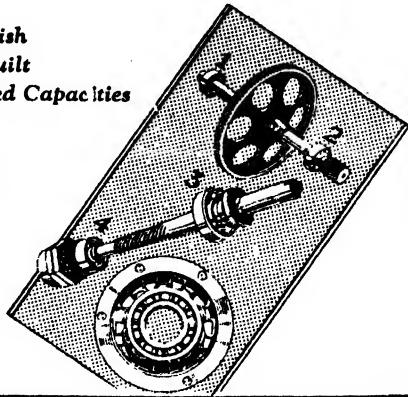
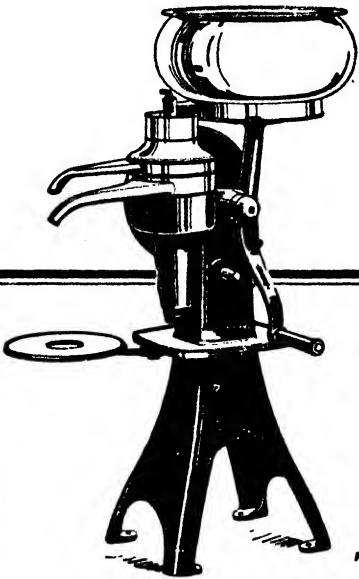
### Tobacco Growing.

Mr. W. J. Spafford (Deputy Director of Agriculture) states that in connection with the growing of tobacco in Australia, it must be remembered by anyone contemplating becoming a grower that air-cured leaf is not saleable, and so it is necessary for all producers to erect a flue-curing barn for the preparation of the leaf. As quality of the cured leaf is more important than quantity, the climate of the locality and the soil type must be carefully considered, because they play a great part towards the production of the required quality. Where the climate of a district is sufficiently favorable for the fermenting of good leaf, the usual difficulty is to find suitable soils, because it appears that in the Adelaide hills good color and fine texture can only be secured on soils so light in color that they are almost white, and then they should be resting on a yellowish clay about 2ft. from the surface. The land should be liberally fertilised with superphosphate, say, 3cwt. per acre, and some of the really light-colored and light-textured soils should also receive sulphate of potash and sulphate of ammonia. If sufficient rain does not fall in the summer to keep the plants growing strongly, just enough irrigation



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water should be given to promote healthy growth. Too much irrigation leads to excessive rankness. The seed should be sown in seed boxes, and, preferably under glass, in September; transplanting will then be done in November. The spacing of the plants will depend on the soil in which they are grown; in the Angaston district they should be about 30in. apart in rows about 36in. apart. There is no one in this State who grows tobacco seedlings for sale, but some growers have a big surplus of plants each year, and they sell them at about £1 per 1,000.

---

#### **Wheats for Low Rainfall Districts.**

Mr. W. J. Spafford (Deputy Director of Agriculture), in reply to the question, "What are the names of the three newest varieties of wheat for drier districts," which was asked at the Conference of Upper North Branches of the Agricultural Bureau, said of proved wheats for dry districts there had been two prominent successes. Nabawa had been the outstanding wheat of the last 10 years for low rainfall conditions. It produced grain of a first-class quality and was resistant to flag smut. Next was Canberra, a variety which was earlier than Early Gluyas, but very susceptible to loose smut. Sultan was also a popular variety and now occupied sixth place on the list of important wheats grown in this State. Roseworthy College had recently bred a wheat "Sword" (Sultan x Ford) which had given better returns than any crossbred wheat raised at the College. In Western Australia two varieties in Noongaar and Merriken were proving themselves under light rainfall conditions.

---

#### **Wheat Mildew.**

The following inquiry has been received from the Elbow Hill Branch of the Agricultural Bureau:—"Several crops of wheat in this district are affected with a disease of some description. The plants affected have a loose, white, powdery substance adhering to the leaves and stem exactly the same as red rust attacks wheat." In reply, the Deputy Director of Agriculture (Mr. W. J. Spafford) says the disease referred to, in all probability, is wheat mildew. In some seasons this disease is fairly common in some portions of the State, but as a rule does not do much damage. It is most noticeable while the wheat plants are quite small, and as the season advances practically all signs of the disease disappear and to outward appearances the crop recovers, although the yield cannot possibly be as good as if the crop had not been affected. When the disease is prominent early in the season, feeding off the affected crop will help it considerably, as admitting sunlight and wind tend to kill the fungus.

---

#### **Flax Culture.**

The Tatiara Branch of the Agricultural Bureau, who sought information on flax culture, has been informed by Mr. W. J. Spafford (Deputy Director of Agriculture) that flax has been grown in many localities in South Australia at different times, and in the early days several mills for handling the fibre were operated, but during each period when interest in the crop was worked up, it was found that other crops were more profitable. The crop grows well anywhere in this State where the annual rainfall is 25in. or more on the average, but for the handling of the flax a plentiful water supply as well as good rainfall is essential.

---

#### **98 per cent. Super.**

At the Conference of Upper North Branches of the Agricultural Bureau the following question was asked, "Have the departmental officers had any experience with 98 per cent. super that is on the market, and would it pay to use same instead of the 45 per cent. as a saving in freight and handling?" Professor A. J. Perkins, in reply, said departmental experience showed that returns from 98 per cent. super corresponded to those secured from equivalent quantities of 45 per cent., i.e., 41lbs. of 98 per cent. super gave



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as good returns as 90lbs. of 45 per cent. He was informed by sellers that Adelaide prices were as follows:—98 per cent. super, £11 15s. per ton; 45 per cent. super, £4 15s. per ton; rail freight to Orreroo, 15s. 6d. per ton. As an illustration, it would be supposed that a farmer put in 300 acres and used 90lbs. of 45 per cent. super per acre, 12.05 tons, which would cost him £57 4s. 9d. for this super. With 98 per cent. super he would need 5.53 tons at £11 5s. per ton, £62 4s. 5d., a difference of £4 19s. 6d. Freight on 12.05 tons of 45 per cent. at 15s. 6d. per ton equals £9 6s. 9d., and freight on 5.53 tons of 98 per cent. super at 15s. 6d. equals £4 5s. 9d.—less difference in costs of super, £4 19s. 6d.—a saving of 1s. 6d. Therefore, there would be a saving of 1s. 6d. only, plus freight and handling on the farm.

### Export Lambs.

Following an inquiry made by the Mount Compass Agricultural Bureau, Mr. W. J. Spafford (Deputy Director of Agriculture) states that the ideal lamb to send to English markets is one that has reached "primeness" whilst being suckled by its mother. In shape it should be short, with deep and broad brisket, and broad, flat back, rounded ribs, rounded rump, well filled between the hind legs, and have relatively short legs. Because it is usual in England to regard the meat from the black-faced breeds of sheep as being better quality than that from the white-faced breeds, the lambs exported should have black faces. The breeds of sheep used to produce ideal export lambs will depend on the natural conditions obtaining. Where the rainfall is heavy and lambs can be reared properly if dropped in the spring, probably the best lambs would be secured by mating Southdown rams with Border Leicester, English Leicester, or Romney Marsh ewes. Next in importance to Southdowns would be Shropshire rams for these conditions, and the ewes might be replaced by Corriedales or halfbreds bred from Merino ewes by one of the long-wool breeds. Where it is essential that the lambs be dropped in the autumn and winter, the ewes would be half-bred Border Leicester, English Leicester, or Lincoln or pure-bred Corriedales, and the rams used would be Southdowns.

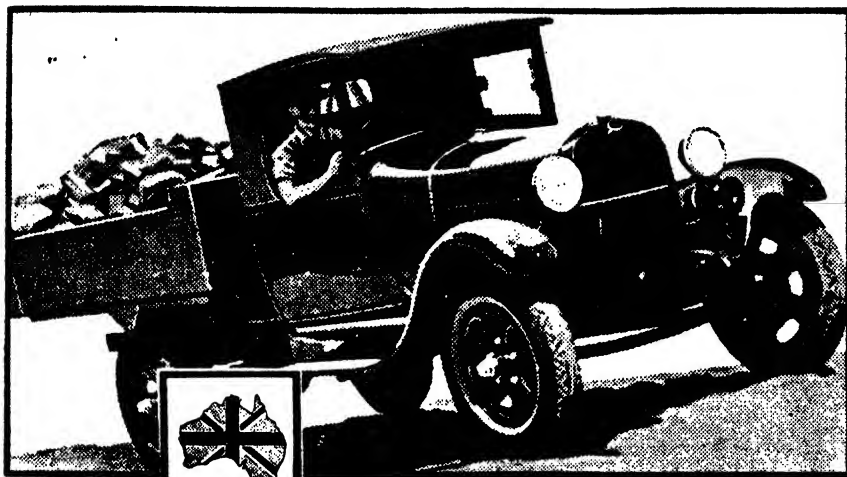
### Planting Orange Trees to Minimise Wind Injuries.

A correspondent at Mannum states that he is planting 300 orange trees, and asks for the best plan to adopt in spacing the trees in order to reduce wind injuries to a minimum. The inquiry was submitted to the Chief Horticultural Instructor (Mr. G. Quinn), who suggests that the trees be planted on what is often called the "staggered" system, but is known to fruitgrowers as the septuple or hexagonal method. This method of allotment places the trees so that viewed diagonally the lines of trees run at an angle of 60° in every direction. For setting out a small area of reasonably even-surfaced land, all that is needed to peg it out accurately is to project a straight line along the outer edge of the headland—preferably along the highest side, if there is any slope on the land. Then take a wire—No. 10 galvanized is suitable—fix a fairly large ring on one end, and on the other fix a pointed stake. See that when the wire is stretched straight the distance from the outer edge of the ring to the centre of the pointed stake, i.e., at the point, is the distance apart the trees are to be planted. Measure with this the spaces on the base line, and drive a peg in at each position.

Then, starting at one end, drop the ring end of the wire over the first peg, draw it tightly, and describe an arc on the ground at what seems midway between the first and second pegs and where the second row is expected to be placed. Move the ring on to No. 2 peg and repeat the movement back over the same spot, and where this second arc intersects the first one is the exact position for a stake. Repeat this from each peg along the full length of the base line, then straighten up and firm this second line of stakes, and use them as a base line to project the next row, and so on across the field.

Two wires of the same length with a ring on each end can be used to define the tree positions. In that case, one end ring encircles adjacent pegs, and the outer ends stretched until the rings overlap, which gives the position for the peg.





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Mr. Quinn suggests, if the land be deep and good, the trees be placed 24ft. apart on this septuple or staggered system. This will give about 87 trees per acre. If the soil is not calculated to grow large trees, set them 22ft. apart septuple, which will take about 102 trees to cover each acre. The space devoted to the pegged-out headland is deducted from the plantable area.

If the trees are planted 24ft. apart on the square and, as suggested, a fifth tree is set in the centre of the square made by each four it will form what is known to fruitgrowers as the quincunx system of allotment. This interplanting system would give about 137 trees as against 75 where the trees are in squares of 24ft. each way. It would not only crowd the trees, but the cultivation lanes would be narrowed down to approximately 17ft. in two directions, and 12 in two others, which certainly allows insufficient room for the trees to expand and a cultivator to be used between them.

If you wish to try planting a wind shelter, why not try a closely-set hedge of common bamboo reeds. They could be set within 25ft. of the outside row of trees, and their roots do not spread long distances.

---

#### Stable Manure and Fruit Trees.

Replying to the Balhannah Branch of the Agricultural Bureau which asked, "What is the chemical action of stable manure on fruit trees?" the Chief Horticultural Instructor (Mr. Geo. Quinn) says it is claimed by authorities on agricultural chemistry that a ton of a pure sample of stable or horse manure, which has not been leached by water or rain or permitted to become excessively heated by fermentative action, and become what is known as "fire fanged," may contain as high as 17lbs. of nitrogen, 13lbs. of potash, 9lbs. of phosphoric acid, and 10lbs. of lime. The average sample of stable manure as handled and used here could not be expected to still retain these quantities, more particularly the nitrogen. The kind of food given the horses and the ages of the animals would also influence the quantities of these compounds found in the manure. As far as our knowledge extends, it is generally conceded that it is not so much the gain received from the direct addition to the land of these plant foods from the manure itself that benefits the trees or crops, but the indirect actions it has on the soil body. The mass of organic matter absorbs water and holds it, whilst in its slow decomposition it liberates heat, and facilitates the formation of carbonic and humic acids, which in turn assist in breaking down insoluble mineral compounds containing plant foods, but which ordinary soil moisture could not bring into solution. Its physical action on the soil renders it friable, open, and aerated. It appears to be the essential medium for securing greater bacterial activity in the soil. It is possible the results of this increased activity are the more direct cause of stimulating the growth of foliage, shoots, and fruits on our fruit trees than is the addition of the quota of the plant food elements mentioned above as being conveyed to the land in the manure itself.

---

#### Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

"Cocoa: World Production and Trade," Report No. 27.

"Biological Control of Insect and Plant Pests," W. R. Thompson, Ph.D., D.Sc., Report No. 29.

"Canadian Fruit Shipments," Report No. 30.

"Production of Tung Oil in the Empire," Report No. 31.

The above are published by the Empire Marketing Board. Price, 1s. each net.



## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by Government Veterinary Officers, Stock and Brands Department.]

"F. W. C.," Hawker, reports cow in milk for 12 months. Milk when scalded becomes curdled.

Reply—The condition may be due to the cow drying off, especially if the cow is well forward in calf. Try the following general treatment:—(1) Give drench of—Epsom salts, 1lb.; ginger, 4 tablespoonfuls; treacle, 1 cupful; warm water, 2 pints. (2) Subsequently feed on good quality feed—bran and chaff (damped), and mix in a handful of sterilised sweet ground bonemeal daily. (3) If green feed is available this will help to restore condition. Advise if condition gets worse.

"H. G. L&G.," Coomandook, asks cure for cows which develop symptoms of staggering gait and staring eyes, then go down, are blown, and ultimately die.

The symptoms point to the trouble being due to either of the following conditions:—  
1. Bloat. 2. Milk fever. 1. *Bloat*.—This is the name given to a condition due to the accumulation of gas in the paunch, and the symptoms vary according to the amount of gas present. Those described by you would occur when the animal is dangerously distended with gas and on the point of suffocation. Treatment must be given at once, and consists of puncturing the paunch (which lies on the left side) in the triangular space situated between the bottom of the spine of the loins, the point of the hip, and the last rib. This may be done by means of a sharp pocket knife, followed by the insertion of a sharpening steel, which is moved about in order to keep the paunch contents from blocking the aperture and preventing the escape of gas. Four tablespoonfuls of oil of turpentine if injected into the paunch through a small tube will also help to prevent further fermentation of contents. In earlier stages the following measures will reduce the gas:—(1) Dabbing a little tar on the nose to make animal use her tongue, which helps to bring up the gas. (2) Placing a gag of wood in the mouth for the same purpose. (3) Drenching with 4ozs. of turpentine (8 tablespoonfuls) in one pint of milk. *Prevention*.—Do not allow on clover or rank grass growth when wet with dew or rain or while animals are hungry. 2. *Milk Fever*.—Somewhat similar symptoms may appear, but are generally restricted to cattle which have calved recently, and usually appear within 48 hours after calving. In these cases the bloating appears after the animal is down and unable to rise, and is due to the accumulation of gas caused by absence of bowel movement. *Treatment*.—Place cow on her brisket and prop up by placing a bag of sand behind her shoulder. Then wash udder with a disinfectant solution, and dry. Then inject each quarter with air until it is firmly distended, and tie teats with tape, which should be removed two hours afterwards. Air inflation may be repeated in three hours' time, but cows affected generally respond to treatment within three hours. The inflation of the udder may be carried out (in the absence of a proper milk fever outfit) by means of a bicycle pump and the valve from a bicycle tube (which must be boiled before inserting into the teat), or the quill of a feather may be inserted after connecting with the bike pump. In a case of milk fever, never drench a cow until she is on her feet and able to drink, otherwise the drench will not be swallowed, but will find its way into the lungs and cause pneumonia.

"G. H. M.," Younghusband, asks treatment for horses that have become gorged with wheat.

Reply—Administer as soon as possible a solution of baking soda in water (4oz. to 2 pints of water), and three hours later give 1½ pints raw linseed oil as a drench. Repeat half the dose of soda solution six hours later and again the following day. Allow animals as much water as they will drink. If feet trouble develops, trim the feet by lowering the heels, and place the animal in a trench containing water or on the swamp.

"W. B. C.," Paskeville, has cow showing symptoms of a form of rheumatism of the hindquarters.

Reply—It is recommended that you feed every other day up to 3ozs. or 4ozs. of either superphosphate, raw rock phosphate, or sweet ground bonemeal, mixed in with damson feed. If not handfeeding, then mix any of the above with coarse salt in the



of two parts of mineral to one part salt, and put the mixture out in a box in a handy position where the cow can have free access to it. To increase palatability, if super or rock phosphate is used, it may be found necessary to add 10 per cent. molasses. Dilute this with half its quantity of water, and then mix well into the mixture of salt and mineral phosphate.

"E. D. B.," Mcgrhiny, asks treatment for cow with a 2½ in. wound following treatment for "bloat."

Reply—When you punctured the paunch you should have injected about 4ozs. of oil of turpentine by means of a rubber tube or hollow piece of metal piping, &c., into the paunch to prevent further fermentation. However, if you can do so, the wound should be sewn up, first the paunch wound and then the skin wound. It is quite possible that the wound may gradually heal, but more probable that a fistula may result, from which food would ooze. If you do not attempt to sew the wounds up, I would suggest placing the animal on dry feeds. If you could obtain 2ozs. of chloroform and mix it with a pint of water, and drench the cow with the mixture when she is tied and on the ground, it will render the animal "dopey," and the sewing could be carried out without the least trouble.

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## ORCHARD NOTES FOR SOUTHERN DISTRICTS. SEPTEMBER, 1930.

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[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

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During the two months ahead of us we may make or mar the output of the orchard for the season. The whole of the work is done with the hope that a good crop of high quality fruit may result. To ensure this it will be necessary to give the very best of attention to the spraying programme. There are probably many important jobs to do, but not any of them are of so great importance as to prevent, as far as possible, the destruction of fruit by fungus and insect pests. We must admit that the weather plays a considerable part in determining our success, and we must work to overcome adverse weather conditions. For the protection of apples and pears against scab use Lime Sulphur or Bordeaux Mixture, either wet or dry; if rain washes it off, it must be put on again as soon as rain ceases. The same applies when Bordeaux is used for curl leaf of peach and nectarine, and shothole of apricot and plum. The preventive must be on the spot when the spores start to grow, or they will get a hold and damage will result. Aphis on peach and cherry must be dealt with as soon as noticed, and it must be carefully looked for; Black Leaf 40 or Nicodust is the material to use, and it must be put on to the insects, and used as often as further broods show themselves.

There is every probability of codlin moth giving us a bad time this year, and a start should be made at once to check it; scrape off all loose bark and remove all rubbish from about the tree. Be ready to get a first treatment so soon as the fruit is formed; forget all the controversy about the calyx spray, and just do it, and do it thoroughly, and keep a good coat of arsenate of lead on the fruit for some weeks ahead. Watch the packing shed and prevent escape of moths.

Treat vines for oidium with dust of sulphur, and watch for downy mildew.

Watch for cutworm on nursery stocks; use arsenate of lead.

Plant citrus trees and see that they do not suffer from want of water.

Keep strawberry beds clean; use a little of dust of sulphur to prevent mildews.

Do any grafting required, using only wood from known clean, good-bearing trees; do this work on fine days only; moisture may stop a good union.

Cultivation will, of course, have been completed; use the harrows after showers, and so keep a good surface; destroy any weeds which may have escaped thus far.

Order fruit cases early and ensure delivery in due time. Dip any used cases in boiling water.



## THE VALUE OF THE AGRICULTURAL DEPARTMENT TO PRIMARY PRODUCERS.

*[An Address given at a Meeting of the Quorn Agricultural Bureau.]*

[By ARTHUR J. PERKINS, Director of Agriculture.]

### INTRODUCTORY.

The subject matter of my address has been suggested by the Quorn Branch of the Agricultural Bureau, and whilst I shall endeavor to do full justice to it, I want it to be understood that I have not altogether been a free agent in the matter. I realise, of course, that quite a variety of reasons might have been responsible for the selection of this subject, but for the purpose of this address I shall assume that the main reason has been the natural interest of a body of producers in the working of a Government Department in which they are closely concerned, and I propose dealing with my subject accordingly. In this connection I shall endeavor to show both what the Department has tried to do, and what its members believe it has succeeded in doing.

### FUNCTIONS OF A DEPARTMENT OF AGRICULTURE.

In the first place, if I were asked to define in the broadest way possible the functions of a Department of Agriculture, I should say that they consisted of official efforts to further the interests of the Rural Industries of the State with which it was connected, and from this viewpoint these functions admit of being grouped under the following headings:—

1. The study of Technical and Economic problems affecting Rural Production.
2. Education and Propaganda work.
3. Administration of special Acts affecting Rural Production.
4. Social work in relation to primary producers.

### HISTORICAL.

The existence of the South Australian Department of Agriculture may be said to date back to the early eighties, when Mr. J. D. Custance was appointed Professor of Agriculture for the State. Its record of work, therefore, extends over 40 to 50 years. Next steps in development were represented by the opening of the Roseworthy Agricultural College in 1885, and the foundation of the Agricultural Bureau in 1888, and subsequently by progressive appointments of specialists in the various branches of agriculture, the establishment of experimental farms and orchards, and the appointment of district Instructors. Personally, I have now been attached to the Department for a period of over 38 years, and am therefore in a position to give first-hand information as to the extent and scope of its work.

I have already stated that the promotion of the interests of the Rural Industries is the main function of an Agricultural Department, and it follows that if we wish to justify the existence of the Department we should at the very least be in a position to show that during the period of its existence these Industries have made material progress. In this connection, however, it should be borne in mind that bricks cannot be made without straw, and that such work as may have been done has been conditioned by the means made available from time to time. Earlier steps were painful enough, not only from the absence of pecuniary support, but also from the lack of sympathy, and at times open hostility of those whom it sought to help.



### PROGRESS OF RURAL INDUSTRIES IN SOUTH AUSTRALIA.

Before, therefore, entering upon any details of work that has been done by the Department, I propose examining briefly what progress has been registered by our Rural Industries during the existence of the Department. Towards this end, I have summarised available mean Statistical data for four successive decades, namely:—

1889-90 to 1898-99.  
1899-1900 to 1908-09.  
1909-10 to 1918-19.  
1919-20 to 1928-29.

To the latter I have added actual figures for 1928-29, the last year for which completed figures are available. It should be recalled, however, that in so far as crop returns are concerned, the results of a single season cannot fairly be compared with those of a decade, as they must vary very considerably according to the character of the special season under consideration. The data in question are given in Tables I., II., and III.—

TABLE I.—*Mean Areas of Four Successive Decades in Contrast with 1928-29.*

|                          | 1889-90<br>to<br>1898-99.<br>Acres. | 1899-1900<br>to<br>1908-09.<br>Acres. | 1909-10<br>to<br>1918-19.<br>Acres. | 1919-20<br>to<br>1928-29.<br>Acres. | 1928-29.<br>Acres. |
|--------------------------|-------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|--------------------|
| Wheat .....              | 1,646,976                           | 1,766,668                             | 2,310,095                           | 2,547,090                           | 3,445,563          |
| Hay .....                | 359,702                             | 335,805                               | 514,887                             | 553,575                             | 497,538            |
| Barley .....             | 14,796                              | 25,733                                | 75,748                              | 205,957                             | 247,348            |
| Oats .....               | 21,227                              | 50,010                                | 122,946                             | 170,406                             | 207,266            |
| Green Forage .....       | 1,451                               | 3,370                                 | 25,182                              | 61,108                              | 107,617            |
| Vineyards .....          | 14,410                              | 21,728                                | 26,539                              | 46,053                              | 51,802             |
| Lucerne .....            | 6,544                               | 13,348                                | 13,032                              | 33,130                              | 47,843             |
| Orchards .....           | 10,602                              | 18,188                                | 25,700                              | 31,974                              | 30,836             |
| Pease .....              | 3,935                               | 6,063                                 | 8,186                               | 10,533                              | 14,244             |
| Potatoes .....           | 6,491                               | 8,258                                 | 6,690                               | 4,357                               | 4,511              |
| Other Crops .....        | 6,465                               | 5,798                                 | 4,875                               | 4,216                               | 5,428              |
| Total Area under Crop .. | 2,088,599                           | 2,254,969                             | 3,133,880                           | 3,668,399                           | 4,660,003          |
| Sown Grasses .....       | 21,221                              | 24,765                                | 26,305                              | 46,133                              | 78,686             |
| Bare Fallow .....        | 576,600                             | 974,643                               | 1,428,513                           | 1,844,173                           | 2,199,231          |
| Total Area Cultivated .. | 2,686,420                           | 3,254,377                             | 4,588,698                           | 5,558,705                           | 6,937,920          |

*Last Three Decades and 1928-29 Expressed in Terms of First Decade taken as Unity.*

|                          |     |     |      |      |      |
|--------------------------|-----|-----|------|------|------|
| Wheat .....              | 1.0 | 1.1 | 1.4  | 1.6  | 2.1  |
| Hay .....                | 1.0 | 0.9 | 1.4  | 1.5  | 1.4  |
| Barley .....             | 1.0 | 1.7 | 5.1  | 13.9 | 16.7 |
| Oats .....               | 1.0 | 2.4 | 5.8  | 8.0  | 9.8  |
| Green Forage .....       | 1.0 | 2.3 | 17.4 | 42.1 | 74.2 |
| Vineyards .....          | 1.0 | 1.5 | 1.8  | 3.2  | 3.6  |
| Lucerne .....            | 1.0 | 2.0 | 2.0  | 5.1  | 7.3  |
| Orchards .....           | 1.0 | 1.7 | 2.4  | 3.0  | 2.9  |
| Pease .....              | 1.0 | 1.5 | 2.0  | 2.7  | 3.6  |
| Potatoes .....           | 1.0 | 1.3 | 1.0  | 0.7  | 0.7  |
| Other Crops .....        | 1.0 | 0.9 | 0.8  | 0.7  | 0.8  |
| Total Area under Crop .. | 1.0 | 1.1 | 1.5  | 1.8  | 2.2  |
| Sown Grasses .....       | 1.0 | 1.2 | 1.2  | 2.2  | 3.7  |
| Bare Fallow .....        | 1.0 | 1.7 | 2.5  | 3.2  | 3.8  |
| Total Area Cultivated .. | 1.0 | 1.2 | 1.7  | 2.1  | 2.6  |

Table I. deals exclusively with areas cultivated and in crop during the four decades and in 1928-29. This Table is divided into two parts the upper one of which gives actual mean areas under crop, &c., in each decade and in 1928-29, and the lower one the same areas represented by 1.0 for the first decade, and for the remaining decades.



and for 1928-29 in terms of those of the first decade taken as unity. This arrangement enables us to see at a glance what progress has been effected in each decade for any type of crop.

Inspection of the Table will show that the total area cultivated has progressed regularly from decade to decade. Starting with a mean of 2,686,000 acres in the first decade and closing with a mean of 5,559,000 acres in the fourth decade, and in 1928-29—the last year of the fourth decade—this figure rose to 6,938,000 acres. Reference to the lower half of the Table will show that in 1928-29 the area cultivated was more than two and a half times that of the mean corresponding area of the first decade. These figures speak for themselves.

The area under crop has made corresponding progress, opening at 2,089,000 acres and closing at 3,668,000 acres for the fourth decade, and 4,660,000 acres for 1928-29.

Taking individual crops, progress has been continuous from decade to decade for Wheat, Barley, Oats, Green Forage, Vineyards, and Pease.

There was a decline in the area cut for hay in the second decade and latterly in 1928-29. On the whole, in view of the almost complete replacement of light horses by motor cars and the encroachment of Tractors and Motor Vehicles on Draught Horses, it is remarkable that the area cut for hay should not have declined to an even greater extent.

The decline in the area under Lucerne in the third decade must be looked upon as purely temporary and accidental.

The recent decline in the area under Orchards is attributable to the economic crisis which Orchardists have had recently to face in view of the present inadequacy of overseas markets, whilst the persistent decline in the area sown to Potatoes is due to the apparent inability of local growers to compete adequately with Eastern producers.

The most marked relative increases in areas under crop have been registered for Green Forage, for which areas cut in the fourth decade were over 42 times greater than those cut in the first decade, and in 1928-29 over 74 times; Barley 14 and 17 times respectively for the same periods; Oats eight and 10 times; and Lucerne five and seven times.

Very remarkable, too, has been the progress achieved in the area treated as Bare Fallow, which from a little over half a million acres in the first decade rose to over 2,000,000 acres in 1928-29. Sown grasses, too, have made correspondingly satisfactory progress.

It will be admitted that these figures show very clear evidence of progress from the viewpoint of areas cultivated or under crop.

Let us next consider the question from the point of view of mean total production, data concerning which have been given in Table II.:

TABLE II.—Mean Rural Production of Four Successive Decades in Contrast with 1928-29.

|                 | 1889-90    | 1899-1900  | 1909-10    | 1919-20    | 1928-29.   |
|-----------------|------------|------------|------------|------------|------------|
|                 | to         | to         | to         | to         |            |
|                 | 1898-99.   | 1908-09.   | 1918-19.   | 1928-29.   |            |
| Wheat .....     | 7,893,084  | 13,545,012 | 24,330,103 | 28,310,512 | 26,826,094 |
| Barley .....    | 172,725    | 418,501    | 1,253,798  | 3,607,724  | 4,583,715  |
| Oats .....      | 170,458    | 705,320    | 1,370,094  | 1,768,286  | 1,740,515  |
| Pease .....     | 53,412     | 99,328     | 106,938    | 99,631     | 93,646     |
| Hay .....       | 288,021    | 381,445    | 604,342    | 640,732    | 486,993    |
| Potatoes .....  | 19,370     | 21,307     | 20,709     | 15,532     | 13,859     |
| Wine .....      | 929,486    | 2,601,331  | 3,576,637  | 10,614,626 | 14,828,968 |
| Raisins .....   | 118,500    | 13,475     | 37,701     | 103,710    | 210,531    |
| Currants .....  | 1,000      | 11,039     | 47,758     | 96,564     | 164,145    |
| Olive Oil ..... | 4,679      | 12,686     | 14,057     | 20,064     | 28,076     |
| Almonds .....   | 2,420      | 6,029      | 4,624      | 6,830      | 6,797      |
| Oranges .....   | 42,320     | 95,805     | 159,013    | 351,991    | 362,527    |
| Lemons .....    | 8,318      | 33,455     | 35,506     | 46,502     | 36,077     |
| Apples .....    | 320,851    | 378,604    | 447,189    | 688,778    | 446,878    |
| Butter .....    | 3,693,822  | 6,716,487  | 8,862,151  | 13,498,503 | 11,315,714 |
| Cheese .....    | 766,365    | 1,107,746  | 1,982,803  | 3,220,758  | 2,975,095  |
| Wool .....      | 45,179,301 | 39,815,476 | 52,375,930 | 64,685,850 | 74,616,004 |
| Honey .....     | 668,031    | 905,751    | 1,020,862  | 1,577,341  | 3,047,421  |



*Last Three Decades and 1928-29 Expressed in Terms of First Decade Taken as Unity.*

|                 | 1889-90<br>to<br>1898-99. | 1899-1900<br>to<br>1908-09. | 1909-10<br>to<br>1918-19. | 1919-20<br>to<br>1928-29. | 1928-29. |
|-----------------|---------------------------|-----------------------------|---------------------------|---------------------------|----------|
| Wheat .....     | 1.0                       | 1.7                         | 3.1                       | 3.6                       | 3.4      |
| Barley .....    | 1.0                       | 2.4                         | 7.3                       | 20.9                      | 26.5     |
| Oats .....      | 1.0                       | 4.1                         | 8.0                       | 10.4                      | 10.2     |
| Pease .....     | 1.0                       | 1.9                         | 2.0                       | 1.9                       | 1.8      |
| Hay .....       | 1.0                       | 1.3                         | 2.1                       | 2.2                       | 1.7      |
| Potatoes .....  | 1.0                       | 1.1                         | 1.1                       | 0.8                       | 0.7      |
| Wine .....      | 1.0                       | 2.8                         | 3.8                       | 11.4                      | 16.0     |
| Raisins .....   | 1.0                       | 0.1                         | 0.3                       | 0.9                       | 1.8      |
| Currants .....  | 1.0                       | 11.0                        | 47.8                      | 96.6                      | 164.1    |
| Olive Oil ..... | 1.0                       | 2.7                         | 3.0                       | 4.3                       | 6.0      |
| Almonds .....   | 1.0                       | 2.5                         | 1.9                       | 2.8                       | 2.8      |
| Oranges .....   | 1.0                       | 2.3                         | 3.8                       | 8.3                       | 8.6      |
| Lemons .....    | 1.0                       | 4.0                         | 4.3                       | 5.6                       | 4.3      |
| Apples .....    | 1.0                       | 1.2                         | 1.4                       | 2.1                       | 1.4      |
| Butter .....    | 1.0                       | 1.8                         | 2.4                       | 3.7                       | 3.1      |
| Cheese .....    | 1.0                       | 1.4                         | 2.6                       | 4.2                       | 3.9      |
| Wool .....      | 1.0                       | 0.9                         | 1.2                       | 1.4                       | 1.7      |
| Honey .....     | 1.0                       | 1.4                         | 1.5                       | 2.4                       | 4.6      |

Table II. sets out production figures from our chief rural industries on the same lines as those already adopted for Table I., namely, the upper portion of the Table gives actual mean values, whilst the lower portion expresses these values in terms of those of the first decade taken as unity.

At this stage I shall recall that the comparison of production returns of a single season with corresponding figures of preceding decades is always open to possible misconstruction because of seasonal vagaries, favorable or otherwise, which must necessarily characterise the single season. In the instance under consideration, the fact must be stressed that over the bulk of our agricultural areas the 1928-29 season was unusually unfavorable, and that production figures of this particular season carry a heavy handicap relatively to corresponding means of preceding decades. Nevertheless, notwithstanding these seasonal difficulties, the progress of seven out of the 18 production items indicated in the Table was continuous over the three decades, including the unfavorable 1928-29 closing season. Of these, the 1928-29 production of Barley was 26.5 times greater than that of the mean of the first decade; of Wine 16 times; of Currants 164.1 times; of Olive Oil six times; of Oranges 8.6 times; of wool 1.7 times; and of Honey 4.6 times.

On the other hand, eight of the Production items indicated showed continuous progress over the three decades, but declined slightly in 1928-29 under the influence of unfavorable seasonal conditions. Of these we may note that Wheat reached in the fourth decade 3.6 times the production of the first decade, but declined to 3.4 times in 1928-29; Oats reached 10.4 and declined to 10.2; for Hay corresponding figures were 2.2 and 1.7; for Apples 2.1 and 1.4; for Butter 3.7 and 3.1; and for Cheese 4.2 and 3.9.

Finally, the Production of Pease, Raisins, and Potatoes have been somewhat irregular over this period of 40 years. Pease in the third decade attained to twice the mean production of the first decade, but declined to 1.9 times in the fourth and to 1.8 in 1928-29. Raisins were below the mean production of the first decade in all three succeeding decades, but rose to 1.8 in 1928-29. The latter fact is due to the comparatively recent development of the Sultana industry. Potatoes rose slightly in the second and third decades, but declined in the fourth, and still more in 1928-29. This unsatisfactory position is due in part to the successful competition of Eastern Potatoes, which local growers should be able to overcome.

On the whole, progress in rural production has been continuous and satisfactory during these 40 years, and particularly so in the matter of Currants, Barley, Wine, Oats, and Oranges.



In Table III. have been summarised data relating to Live Stock, Fertilisers, and Mean Crop Yields:—

TABLE III.—*Additional Statistical Data of Periods under Consideration.*

|                                                                                         | 1889-90<br>to<br>1898-99. | 1899-1900<br>to<br>1908-09. | 1909-10<br>to<br>1918-19. | 1919-20<br>to<br>1928-29. | 1928-29.  |
|-----------------------------------------------------------------------------------------|---------------------------|-----------------------------|---------------------------|---------------------------|-----------|
| <i>Livestock—</i>                                                                       |                           |                             |                           |                           |           |
| Horses .....                                                                            | 177,216                   | 185,031                     | 261,036                   | 248,674                   | 205,865   |
| Cattle .....                                                                            | 338,149                   | 275,102                     | 333,083                   | 367,760                   | 263,016   |
| Dairy cows .....                                                                        | 79,134                    | 87,887                      | 114,232                   | 143,057                   | 108,969   |
| Sheep .....                                                                             | 6,365,528                 | 5,840,791                   | 5,525,496                 | 6,660,954                 | 7,079,947 |
| Pigs .....                                                                              | 76,109                    | 94,224                      | 84,798                    | 75,865                    | 62,733    |
| <i>Fertilisers—</i>                                                                     |                           |                             |                           |                           |           |
| Quantities .....                                                                        | Tons 1,657                | 54,684                      | 90,807                    | 126,970                   | 171,965   |
| Areas treated .....                                                                     | Acres 37,160              | 1,021,108                   | 2,577,926                 | 3,239,315                 | 4,251,348 |
| Dressing per Acre .....                                                                 | Lbs. 100                  | 120                         | 79                        | 88                        | 91        |
| <i>Mean Crop Yields—</i>                                                                |                           |                             |                           |                           |           |
| Wheat .....                                                                             | Bush. 4.80                | 7.67                        | 10.51                     | 11.11                     | 7.79      |
| Barley .....                                                                            | " 11.67                   | 16.26                       | 16.55                     | 17.52                     | 18.53     |
| Oats .....                                                                              | " 8.03                    | 14.10                       | 11.14                     | 10.38                     | 8.40      |
| Pease .....                                                                             | " 1.57                    | 16.38                       | 13.06                     | 9.45                      | 6.57      |
| Hay .....                                                                               | Tons 0.80                 | 1.14                        | 1.17                      | 1.16                      | 0.98      |
| Potatoes .....                                                                          | " 2.98                    | 2.58                        | 3.10                      | 3.56                      | 3.07      |
| <i>Last Three Decades and 1928-29 Expressed in Terms of First Decade Taken as Unit.</i> |                           |                             |                           |                           |           |
| Horses .....                                                                            | 1.0                       | 1.0                         | 1.5                       | 1.4                       | 1.2       |
| Cattle .....                                                                            | 1.0                       | 0.8                         | 1.0                       | 1.1                       | 0.8       |
| Dairy cows .....                                                                        | 1.0                       | 1.1                         | 1.4                       | 1.8                       | 1.4       |
| Sheep .....                                                                             | 1.0                       | 0.9                         | 0.9                       | 1.0                       | 1.1       |
| Pigs .....                                                                              | 1.0                       | 1.2                         | 1.1                       | 1.0                       | 0.8       |
| Fertilisers .....                                                                       | 1.0                       | 33.0                        | 54.8                      | 76.6                      | 103.8     |
| Areas dressed .....                                                                     | 1.0                       | 27.5                        | 69.4                      | 87.1                      | 114.4     |
| <i>Mean Yields per Acre—</i>                                                            |                           |                             |                           |                           |           |
| Wheat .....                                                                             | 1.0                       | 1.6                         | 2.2                       | 2.3                       | 1.6       |
| Barley .....                                                                            | 1.0                       | 1.4                         | 1.4                       | 1.5                       | 1.6       |
| Oats .....                                                                              | 1.0                       | 1.8                         | 1.4                       | 1.3                       | 1.0       |
| Pease .....                                                                             | 1.0                       | 1.2                         | 1.0                       | 0.7                       | 0.5       |
| Hay .....                                                                               | 1.0                       | 1.4                         | 1.5                       | 1.5                       | 1.2       |
| Potatoes .....                                                                          | 1.0                       | 0.9                         | 1.0                       | 1.2                       | 1.0       |

It will be noted that, whilst Horses increased in numbers in the second and third decades, they decreased very appreciably in the fourth, and particularly in 1928-29, notwithstanding the fact that relatively to the third decade the area under cultivation in the fourth decade increased by 970,000. acres, and relatively to the fourth decade by 1,379,000 acres in 1928-29. This decline is attributable mainly to the general extension of motor vehicles and tractors. Dairy Cattle made progress in the three decades, but declined in 1928-29, whilst the progress of Sheep was continuous throughout. Pigs, on the other hand, have been more or less stationary owing to lack of adequate overseas market facilities.

The progress in the use of artificial fertilisers have been very striking, attaining in 1928-29 to 103.8 times the mean quantities used in the first decade. Similarly, in the same season the area dressed with fertilisers rose to 114.4 times the mean area so treated in the first decade.

It would not be fair to compare mean crop yields of a single season with the corresponding means of decades. I shall therefore content myself with saying that, with the exception of Pease, all crops have shown improved mean yields throughout the four decades.

I believe that I have succeeded in showing that over a period of 40 successive years the progress achieved in our rural industries has been highly creditable to all those concerned, but what is of even greater significance is that production from the areas



concerned has increased at an even greater rate than the expansion in territory occupied. Nor should it be forgotten that over recent decades new areas brought under the plough have been on the whole less fertile and under less favorable rainfall conditions than older settled areas, and that for many years they have carried crops only partially reclaimed from scrub. In these circumstances, crops from the more recently settled areas must have had a reducing rather than an improving influence on mean State yields. It follows therefore that the actually progressive improvement in mean State yields is all the more meritorious.

#### RELATIONSHIP OF THE DEPARTMENT OF AGRICULTURE TO RURAL PROGRESS.

I have already stated that to all intents and purposes the period of 40 years under consideration coincides with the existence of the Department of Agriculture in this State. I do not, however, wish to take credit where credit is not due, and recognise freely that the ultimate factors behind whatever progress may have been achieved have been the energy and enterprise of the rural community. But it is easy to imagine that all this energy and enterprise might have been headed in a wrong direction and wasted itself in more or less futile effort. I suggest, in this connection, that in fulfilment of its normal role the Department of Agriculture studied those facts which appeared to make progress possible, and gave eventually to its conclusions the widest publicity that circumstances permitted; may I say that it smoothed the way for achievements in which it could take no active part, and in some few instances perhaps rendered them almost inevitable. Let me support these views by a few typical examples.

#### PROGRESS IN WHEAT GROWING.

I shall deal with Wheat in the first place, and in greatest detail, because, as you know, it lies at the basis of all our farming interests, and is indeed the sheet-anchor of our national prosperity. I have already shown that by the end of the 40 years under consideration our area under Wheat had more than doubled, and our production increased by more than three and a half times; this improvement in production, both actual and relative, is undoubtedly due to general improvement in farming methods. How has this been brought about? First, by an intelligent study of the problems of wheat growing under conditions at the time comparatively unknown; and, secondly, by dissemination of the knowledge acquired throughout the length and breadth of the land.

#### PREPARATION OF THE LAND.

We all know to-day that the first essential to a successful Wheat Crop in this State is adequate preparation of the land; without it, apart from very exceptional seasons, we can anticipate nothing better than mediocre crop yields. We have learnt, too, that with the large individual areas usually sown, coupled with the usually late arrival of Autumn rains, that it is practically impossible to get land ready for Wheat in the course of the season in which it is sown; from these facts has arisen the practice of fallowing land in the Winter months immediately preceding sowing. If we examine Table I. we shall see that in the first decade the mean area treated as Bare Fallow was a little over half a million acres, or 2.9 acres under wheat for every acre fallowed; in the fourth decade the mean area fallowed was over one and three-quarter million acres, or 1.4 acres under wheat for every acre fallowed. The increase in area of Wheat sown on Bare Fallow has therefore been both actual and relative; but the improvement in practice does not end there. We know very well to-day that there is both "fallow" and "fallow"; and those amongst us who are old enough can recall very well the difference between "fallow" of 40 years ago and "fallow" of to-day; and the Department can claim some credit for this improvement that has been very largely responsible for the steady increase in our mean Wheat yields. The work in this connection was first started at Roseworthy Agricultural College and extended subsequently



to the various Experimental Farms; and as in the course of years results secured became apparent, they were given publicity through the pages of the *Journal of Agriculture*, through the daily press, and in the course of public Lectures. Many will recall Professor Lowrie's telling addresses on the subject, and his work has been continued since by other officers. I must add here that our propaganda on this and other subjects would never have proved as effective as it has proved had it not been for the existence of the Agricultural Bureau system in our midst. It is this system that has enabled us to reach farmers most effectively; by its means Departmental Officers have secured the confidence of some of the best men of the farming districts; the latter have adopted our recommendations, and their example has subsequently acted as leaven which has spread through the farming community and led to immense improvement in our wheat yields.

#### USE OF SUPERPHOSPHATE.

Next in importance to soil tillage comes the regular dressing of soluble phosphates to sown crops. Here, again, credit for initiation of the practice must be given to the first Principal of the Roseworthy Agricultural College, Professor J. D. Custance, and for intensive propaganda on the subject by his successor, Professor W. Lowrie; since their time the whole question of the application of these phosphates to both crops and pastures has been closely studied by departmental officers. Our combined work, extending over the whole of our agricultural areas, goes to show that at current prices for Wheat and Fertilisers maximum economic results are usually secured with dressings of 180lbs. of 45 per cent. Superphosphate; we have also shown that the less soluble basic phosphates and the more or less insoluble ground rock phosphate are both unsatisfactory as crop dressings over the bulk of our territory. That our work in this direction has been confirmed in every-day practice, and that our propaganda on the subject has proved effective, is shown by the fact that whilst in 1897-98 it is estimated that we had 60,000 acres, or 2.9 per cent. of the area cropped, dressed with 2,000 tons of Superphosphate, corresponding figures for 1928-29 were 4,251,348 acres, or 91.2 per cent. of the area cropped, and 172,000 tons, increases in 32 years of 6,986 and 8,500 per cent. respectively.

Farmers are often accused of being conservative in their practices; nor is such an attitude altogether unreasonable when questions involving a livelihood are at stake. The vagaries of the weather are usually sufficiently perplexing to satisfy the farmer's gambling instinct. In the circumstances the rapidity of the spread of superphosphate over our rural areas is all the more remarkable, particularly when we recollect that it involved more than the systematic use of a fertiliser. It included as well a complete revolution in methods of seeding, the supersession of the old broadcaster and the sowing of 50 to 80 acres a day, by the old drills which in earlier days rarely did more than 12 to 15 acres. Professor Custance was advised to place his drill in the Adelaide Museum.

#### TOP DRESSING.

In the course of time, it was noted that the growth of natural feed on the stubbles of fertilised Wheat crops was infinitely superior in quantity and feeding value to the normal type of feed that grew on unfertilised fields, and that in such circumstances the residual phosphate increased the carrying capacity of land temporarily out of cultivation very considerably. More recently, following on these observations, the practice of top dressing pastures, particularly in our moister districts, has come into vogue. This practice has received special attention on the Kybybolite Experimental Farm. We have been able to show on this Farm that, whilst the carrying capacity of unmanured natural pasture gradually deteriorates, that of adequately dressed land, neither broken with the plough nor sown to grasses, rose from three-fourths of a sheep to the acre to over three sheep in the course of nine years.



The areas of pasture lands top dressed with phosphates were not recorded until 1924-25, and available Statistical data are as follows:—

|                   | Areas Dressed.<br>Acres. | Superphosphate |
|-------------------|--------------------------|----------------|
|                   |                          | Used.<br>Tons. |
| 1924-25 . . . . . | 67,124                   | 4,080          |
| 1925-26 . . . . . | 123,657                  | 7,380          |
| 1926-27 . . . . . | 162,355                  | 9,110          |
| 1927-28 . . . . . | 209,122                  | 11,393         |
| 1928-29 . . . . . | 250,413                  | 13,029         |

#### OTHER MANURES.

I am of the opinion, too, that in negative fashion the Department of Agriculture has been of assistance to Wheat Growers in testing the local value of the other two main lines of fertilisers, namely, nitrogenous and potassic manures. We have shown very definitely that apart from very exceptional cases the use of these fertilisers by local cereal growers can only result in serious losses. We have also endeavored to protect them, although not always successfully, against insidious propaganda of "quack" preparations.

#### IMPROVED SEED.

Another contributing factor to locally improved Crop yields has been the systematic use of high-class seed adapted to local conditions. In this connection, there are three points that are involved:—

1. The adaptability to climate and soil of the varieties in use;
2. Their yielding capacities; and
3. The general condition of the seed used.

And, whilst I claim that the Department has done good work covering all these points, I recognise that it has not been alone in the field. It is only necessary to mention such well-known names as those of Richard Marshall, Frederick Coleman, Oliver Badman, W. J. Marshman, &c., to make that point clear. Nevertheless, work of considerable value in this direction has been carried out both at the Roseworthy Agricultural College and on the Experimental Farms. Since 1905 this question has received attention at the Agricultural College from two points of view, namely, the creation of new and improved varieties adapted to local conditions, and the maintenance of high yielding characteristics by systematic selection in both new and old varieties. That this work has proved eminently successful is shown by the extent to which older varieties have been displaced by new Roseworthy Wheats. In 1928-29 out of a total area sown to Wheat of 3,775,601 acres, 1,342,031 acres, or 35.55 per cent. were sown to College bred wheats, and if we take into consideration that that well-known old Wheat, *Ghuyas*, was taken in hand by the College in 1905 and separated into three separate varieties, and improved by constant selection, it can probably be said that half the Wheat sown in South Australia is connected directly or indirectly with the breeding or selection Plots of Roseworthy Agricultural College. In this direction alone the influence of the College on the productivity of our Wheat Fields has been very beneficial.

As to the third point, namely, the character of the seed sample sown, we have also assisted by means of propaganda. There was an old prejudice prevalent in earlier days, namely, that any kind of sample would do for seed. I have heard it maintained, for example, that the smallest grains were most suitable for seed, because there were more of them to the bushel. By consistently advocating that only the best, cleanest, well ripened and well cared for sample should be used we have helped farmers to better crops.

#### DISEASES.

Finally, there is the question of disease. I have not the time to go into details here, but I shall say that we have consistently studied the problems as they arose and made known what precautionary or repressive measures appeared to meet the case, and to this extent we have assisted farmers to more profitable crops.



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## MONEY VALUE TO IMPROVED METHODS.

What has this meant to the farming community and the State as a whole in terms of hard Cash? If we take the 30-year period extending between 1876 and 1906 we shall see that the mean yearly area under Wheat was 1,668,449 acres and the mean total production 9,834,367bush., representing a mean yield per acre of 5.89bush. If, on the other hand, we take the 20-year period extending from 1906 to 1926, we find the mean area under Wheat to have been 2,227,472 acres and mean total production 24,797,753bush., or 11.13bush. per acre. Hence, during the 20-year period ending in 1926, the mean production of Wheat per acre was approximately twice that of the immediately preceding 30 years, an achievement of which both the farmers concerned and the Department of Agriculture have good reason to be proud.

It will be observed that in this period of 30 years (1876-1906) are included the first 20 years of the existence of the Department of Agriculture (1886-1906), and the fact that over that period little progress could be registered for Wheat growing is an indication of the difficulties that had to be overcome in the initial stages of our work. We had in the first instance to determine along what lines progress could best be achieved, and in the second we had to gain the confidence of the farming community and convince it of the soundness of the methods we advocated. The value to the State of the general adoption of improved farming practices in the second 20 years of the Department's existence, when our influence had begun to be felt, can be expressed in terms of hard cash as follows:—

Between 1906 and 1926 (20 years) we produced 495,955,000bush. of Wheat as against 295,031,000 in the immediately preceding 30 years. Had production in the 1906-1926 period been on the same low scale as in 1876-1906 period, i.e., 5.89bush. to the acre, we should have had 262,396,000bush. only. The difference between what we actually secured and what we might have secured (233,559,000bush.) represents the fruits of the extension of better farming methods, towards which we believe the Department of Agriculture contributed no small part. Over this 20-year period Wheat averaged at Port Adelaide in the neighborhood of 5s. a bushel. The gain to the State from improved farming has therefore been represented approximately during this period of 20 years by £58,390,000, or close on £3,000,000 per annum from Wheat alone.

The contribution of the Department of Agriculture towards this State gain of £3,000,000 per annum from Wheat alone is perhaps more or less intangible, and therefore difficult to express in terms of hard cash. It is nevertheless fair to state that, whilst many of our foremost farmers could probably have got along without departmental guidance, this cannot be said of the average man, whom we have certainly helped to higher mean yields of Wheat. At what rate can we assess this service that we have rendered to the average man and therefore to the State as a whole? If, in our modesty, we claim 1bush. an acre on the mean area under Wheat during these 20 years, shall we be going too far? If not, our services over a period of 20 years will have been worth over £500,000 per annum to the farming community and the State from Wheat returns alone.

## OTHER DEPARTMENTAL ACTIVITIES.

I have dwelt in some detail upon the relationship of Wheat to the Department, because it covered matters in which you were chiefly interested, and because, after all, it represents our main agricultural and State concern. I need not add, however, that the activities of the Department have not been confined to Wheat, but for fear of wearying you, I can do no more than touch upon other matters in which the Department has been concerned.

We have done much to emphasise the advantage of associating Live Stock, particularly Sheep, with the growing of Cereal Crops. This question was given special attention when I was in charge of the Roseworthy Agricultural College. As a result of 10 years'



experience on the subject I was able to show that the College Farm had averaged a sheep to the acre on the whole area, notwithstanding the fact that two-fifths of the area was under Cereals, two-fifths treated as Bare Fallow and under forage crops, and one-fifth only available wholly for pasture purposes. Since my time, my successor, Mr. Colebatch, made a close study of the types of Sheep best adapted to the production of Export Fat Lambs. The handling of Live Stock on Farms naturally led to the question of grazing crops and hand-feeding generally, which is unavoidable for portion of the year on any farm on which Live Stock is kept. I am afraid that the advocacy of general association of Live Stock with crops must be described as one of those things in which the Department has not yet been completely successful. I am of the opinion that in the course of time both our Dairy Cows and our Sheep can be doubled in this State without appreciable reduction in areas at present sown to Wheat.

Whilst on this subject, I would like to state that excellent pasture improvement work has been carried out by us on the Kybybolite Experimental Farm. It is true that this work is applicable essentially to the South-East and our districts of heavy rainfall. It affects, nevertheless, districts the past productivity of which has been low and which may be counted upon in the future to swell our rural production very considerably.

Through our Berri Experimental Orchard we have endeavored to accumulate data of immediate value to River Orchardists, and the same can be said of the Blackwood Orchard for the Hills district.

At Parafield, Egg Laying strains of Fowls have been raised to a high degree of perfection, and their progeny has been distributed all over the State at reasonable rates, and has contributed very appreciably towards general improvement in our Poultry Industry. In this connection I would like to express appreciation of the sterling work done by Mr. D. F. Laurie, who after long association with the Department, has recently retired into private life.

It has often been said that South Australia was not a Dairying State, chiefly because of the inadequacy of our natural pastures from the viewpoint of cows in milk. The flush period is of short duration and cows soon find themselves on dry feed, which, however suitable for sheep, is not favorable to heavy milk production. Nevertheless, as a Department we have faith in the Dairy Industry even under these conditions. I need not remind you that in the dry Nineties cows and fowls enabled many a struggling wheatfarmer to keep on the land. With the fall in prices of Wheat and Wool, history would appear to be repeating itself, and once again farmers are coming to recognise that the vagaries of seasons and markets render unwise specialisation in any one form of rural activity to the exclusion of all others. Our view is that, wherever practicable, the revenues of every farmer should include eggs, cream, and to some extent pigs. Butter, Cheese, Eggs, and Bacon are commodities for which there is world-wide demand, and we look to farmers to help us to double South Australia's present output. Departmentally we have to admit that, notwithstanding active propaganda on the subject, progress in dairying has not been one of our successes, and much as we deplore them we look to the bad times through which we are passing to assist us in overcoming the average South Australian's aversion to cows. Apart from propaganda and instructional work, we have endeavored to assist Dairymen by forming Herd Testing Associations, the main object of which is the elimination of the unprofitable cow, coupled with the proof—if any were needed—that it does not pay to starve cows. We have also undertaken the testing of the milk supply of pure bred herds and established a subsidy scheme, by means of which Dairymen can secure Bulls from heavy milking ancestry at reasonable rates. Both schemes should, in the course of time, tend to improve very considerably the productivity of our herds.



We have also given special attention to Farm Economics at the Turretfield Demonstration Farm, which over the past nine years has been worked upon strictly business lines. Among other things, we have shown what have been the mean inclusive costs of main Farm Crops in a district of this kind, the mean costs of upkeep of a Fat Lamb Flock, and the usual costs of various farm manual operations.

On our four Experimental Farms we have endeavored to solve the farming problems of the districts in which they are situated, and we have used them for the supply to farmers of improved pedigree Seed Wheat, Oats, and Barley.

In other directions the Department of Agriculture is concerned in activities which, although at times less pleasant, have nevertheless an indirect bearing upon the successes and failures of the rural community. I refer to our inspectional and police duties that form part of the administration of various Acts. Among other things, it is our duty to watch over the manufacture and distribution of fertilisers, to keep an eye on Chaff Mills and the sale of Insecticides and Fungicides, to enforce the provision of Acts dealing with the control of Plant Diseases. In the latter connection, it is one of our triumphs that we should have been able to keep South Australia free from the Phylloxera, which has destroyed the Vineyards of neighboring States. The recently enacted Dairy Act will compel us to watch both the sellers of Cream and the manufacturers of Butter. All these Acts have been passed in the interests of rural production, and however disagreeable their enforcement may at times prove, we believe it to be our duty, both in the interests of rural producers and of the State, to give effect to them with rigid impartiality.

Finally, I come to our educational efforts. Roseworthy Agricultural College, as you know, takes young men in hand and strives to impart to them sound technical training in agricultural subjects adapted to local conditions. I need not stress this point. Roseworthy graduates occupy important positions in the various Departments of Agriculture; they are known as successful farmers, graziers, fruitgrowers, vinegrowers, dairymen, &c., in various parts of the State; they are even to be found in Parliament, on the Supreme Court benches, and in the pulpit. Nor have we lost sight of the value of adult education. We have agricultural, dairy, and fruit instructors in various parts of the State whose business it is to visit producers on their holdings and give such advice as may be required. We have organised Demonstration Plots on private farms and in association with Branches of the Agricultural Bureau all over the State. We have established Crop Competitions, Pruning Matches, &c., with a view to stimulating production and improving the practice of manual operations. We are frequently called upon to tender advice by correspondence. I find that apart altogether from the Roseworthy College and such correspondence as may be undertaken by District Instructors, we sent from the Adelaide Office alone during the 12 months ending on June 30th close on 1,800 letters of advice to rural producers. We have soils and waters analysed free of charge to producers whenever the circumstances appear to warrant it; in 1928-29 about 230 such analyses were carried out. We publish, too, a *Journal of Agriculture* and issue Bulletins on matters of special or general interest to farmers. And, finally, we have the Agricultural Bureau system, than which I know of no institution better calculated to give the rural community a common rallying ground, from which mutual help can be given and grievances ventilated.

I have touched on many points in this address, in many cases very lightly, and I fear altogether inadequately. I hope, however, that in some measure I have justified the existence of the Department of Agriculture. Personally I have been associated with it in various capacities for close on 40 years, and I am prepared to assert that, apart from very minor exceptions, officers of the Department have always been alive to their duties and endeavored to give effect to them to the best of their abilities and to the extent that available funds permitted.



## FIELD PEASE AND OATS V. MEGGITT'S NUTS.

[By PROFESSOR A. J. PERKINS, Director of Agriculture.]

[*Reply to a question, "How do Field Pease at 5s. 9d. per bushel and Oats at 2s. 6d. per bushel compare for Price and Food Values with Meggitt's Nuts, £14 per ton at Port Adelaide?" submitted by the Port Elliot Branch at the Conference of Southern Branches, Murray Bridge, August 20th, 1930.*]

The comparison of different Foodstuffs one with the other is not always easy, particularly when they differ widely in character, as for instance "Hay Chaff" on the one hand and a concentrated Foodstuff on the other, such as Meggitt's Nuts. The comparison between Pease and Oats, and Meggitt's Nuts is, however, much simpler. The results are determined on the food units present in each foodstuff; and towards that end each foodstuff is compared to one special substance taken as unit. In earlier times an attempt was made to use "meadow hay" as a standard, but results were generally unsatisfactory. More recently "Starch" has been adopted as the standard of comparison, and what is known as the Starch Equivalent of a foodstuff is the number of pounds of Starch required to give rise to the same feeding results as 100lbs. of the foodstuff under consideration. Starch Equivalence is based on the analysis of the Foodstuff coupled with direct tests of the digestibility of the foodstuff under consideration.

In Table I. I have given the usual Organic Analysis of the three foodstuffs under consideration, together with Wheat and Bran:—

TABLE I.—*Showing Organic Analysis of Foodstuffs.*

|                   | PEASE. | OATS. | MEGGITT'S<br>NUTS. | BRAN. | WHEAT. |
|-------------------|--------|-------|--------------------|-------|--------|
|                   | %      | %     | %                  | %     | %      |
| Moisture .....    | 14.0   | 13.3  | 10.6               | 12.2  | 13.4   |
| Ash .....         | 2.8    | 3.1   | 6.1                | 3.6   | 1.7    |
| Protein.....      | 22.5   | 10.3  | 27.0               | 16.4  | 12.1   |
| Fats .....        | 1.6    | 4.8   | 6.9                | 2.6   | 1.9    |
| Fibre .....       | 5.4    | 10.3  | 9.8                | 8.4   | 1.9    |
| Starches, &c..... | 53.7   | 58.2  | 39.6               | 56.8  | 69.0   |
|                   | 100.0  | 100.0 | 100.0              | 100.0 | 100.0  |

In comparison with the four other foodstuffs Meggitt's Sheep Nuts has less moisture, and therefore a higher proportion of available Dry Matter. This is, however, neutralised by the higher Ash Content, which leaves available organic matter very similar in all five foodstuffs, the highest being Wheat with 84.9 per cent., and the lowest Pease with 83.2 per cent. The chief characteristic of Meggitt's Nuts is a high proportion of crude protein—27 per cent. and of Fats, 6.9 per cent.

Pease, on the other hand, are rich in crude Protein, 22.5 per cent., but poor in fats, 1.6 per cent., whilst Oats are richer in Fats, 4.8 per cent., but poorer in Protein, 10.3 per cent.

In this connection it should be noted that whilst Protein is the characteristic substance entering into the composition of flesh and muscle—lean meat is almost pure protein—and forms important parts of milk, wool, &c. Starches, Fats, and Fibre are responsible mainly for the formation of body fat and the development of energy.



The value of a Foodstuff cannot, however, be based exclusively upon its chemical composition; much depends upon the digestibility of the various food units; the extent to which the latter are digestible has been indicated below in Table II.

TABLE II.—*Indicating Percentage Digestibility of the Five Foodstuffs.*

|                              | PEASE. | OATS. | MEGGITT'S<br>NUTS. | BRAN. | WHEAT. |
|------------------------------|--------|-------|--------------------|-------|--------|
|                              | %      | %     | %                  | %     | %      |
| Digestible Protein .....     | 19.4   | 8.0   | 23.3               | 13.0  | 10.2   |
| Digestible Fats .....        | 1.0    | 4.0   | 6.3                | 1.8   | 1.2    |
| Digestible Fibre .....       | 2.5    | 2.6   | 3.1                | 2.2   | 0.9    |
| Digestible Starches, &c. ... | 49.9   | 44.8  | 30.9               | 40.3  | 63.5   |
| Foodstuff Value .....        | 98     | 95    | 97                 | 77    | 97     |
| Starch Equivalent .....      | 68.6   | 59.7  | 69.0               | 46.2  | 73.2   |

It must be understood that in every instance the figures given in Table II. have reference to first-class samples only, and that any inferiority in the sample would lead to corresponding depression of the figures given. The last figures in the Table—Starch Equivalents—set out the relative value of each foodstuff on parity of weight; that is to say, in the matter of Food Values 100lbs. of Pease would be equivalent to 68.6lbs. of Starch, 100lbs. of Oats to 59.7lbs., &c. The value of the Foodstuffs are therefore inversely proportional to their Starch Equivalents; and it is in this fashion that their relative money values can be determined. These have been indicated in Table III. in terms of each foodstuff successively.

TABLE III.—*Showing Relative Monetary Value of Foodstuffs.*

|                          | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
|--------------------------|---------|---------|---------|---------|---------|
| Meggitt's Nuts 2,000lbs. | 14 0 0  | 9 18 5  | 9 12 9  | 7 5 4   | 5 10 0  |
| Bran ..... 2,000 "       | 9 3 5   | 6 10 0  | 6 6 3   | 4 14 8  | 3 12 0  |
| Pease ..... 60 "         | 0 8 4   | 0 5 11  | 0 5 9   | 0 4 4   | 0 3 3   |
| Oats ..... 40 "          | 0 4 10  | 0 3 5   | 0 3 4   | 0 2 6   | 0 1 11  |
| Wheat ..... 60 "         | 0 9 0   | 0 6 4   | 0 6 2   | 0 4 7   | 0 3 6   |

It will be seen that the four foodstuffs in order of present-day market values are more costly in the following order:—

1. Meggitt's Nuts
2. Bran
3. Pease
4. Oats
5. Wheat

The requirements of a 100lbs. Sheep, both for maintenance and Fattening ration, may be summarised as follows:—

*For daily Maintenance Ration—*

|                             |               |
|-----------------------------|---------------|
| Starch Equivalent .. . . .  | 0.83lbs.      |
| Dry Matter .. . . .         | 1.8 — 2.3lbs. |
| Digestible Protein .. . . . | 0.12lbs.      |

*For Fattening purposes—*

|                             |               |
|-----------------------------|---------------|
| Starch Equivalent .. . . .  | 1.45lbs.      |
| Dry Matter .. . . .         | 2.4 — 3.2lbs. |
| Digestible Protein .. . . . | 0.19lbs.      |



Below are given typical rations, based on the above:—

| Maintenance Rations. |         |          | Fattening Rations |          |       |
|----------------------|---------|----------|-------------------|----------|-------|
|                      |         | Cost.    |                   |          | Cost. |
| 1. Chaff .....       | 1½ lbs. | } 1·89d. | 1½ lbs.           | } 2·43d. |       |
| Pease .....          | ½ "     |          | ½ "               |          |       |
| Barley .....         | —       |          | 1 "               |          |       |
| 2. Chaff .....       | 1½ lbs. | } 1·69d. | 1½ lbs.           | } 2·44d. |       |
| Oats .....           | ½ "     |          | 1½ "              |          |       |
| 3. Chaff .....       | 2 lbs.  | } 1·89d. | 1½ lbs.           | } 2·44d. |       |
| Bran .....           | ½ "     |          | ½ "               |          |       |
| Barley .....         | —       |          | 1 "               |          |       |
| 4. Chaff .....       | 1½ lbs. | } 1·90d. | 1½ lbs.           | } 2·44d. |       |
| Meggitt's Nuts ..... | ½ "     |          | ½ "               |          |       |
| Barley .....         | —       |          | 1 "               |          |       |
| 5. Chaff .....       | 1½ lbs. | } 1·48d. | 2 lbs.            | } 2·29d. |       |
| Wheat .....          | ½ "     |          | 1½ "              |          |       |

Prices adopted:—

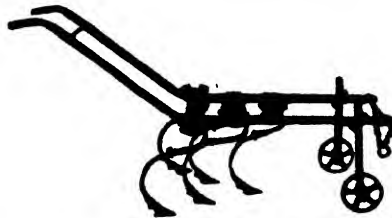
|                | £ | s. | d. |                 | £ | s. | d. |
|----------------|---|----|----|-----------------|---|----|----|
| Chaff .. . . . | 7 | 0  | 0  | Barley .. . . . | 0 | 2  | 3  |
| Pease .. . . . | 0 | 5  | 9  | Bran .. . . .   | 6 | 10 | 0  |
| Oats .. . . .  | 0 | 2  | 6  | Wheat .. . . .  | 0 | 3  | 6  |

From the above will be noted that at current prices Wheat is to-day the cheapest livestock Foodstuff on the market.

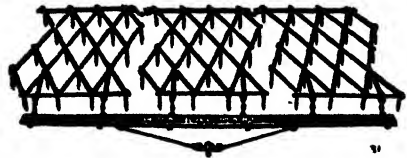
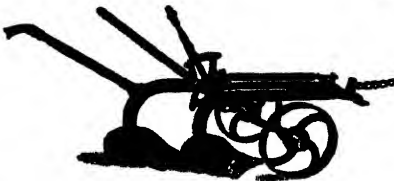


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APPLES FOR LIVESTOCK.

[By W. J. SPAFFORD, Deputy Director of Agriculture.]

In South Australia there are over 10,000 acres carrying Apple trees, and in some seasons the quantity of fruit which falls to the ground or is excluded from our markets because of other defects is really enormous. Many apple-growers regularly utilise all fallen apples as feed for livestock; still others allow the waste fruit to decompose where it falls, and as this latter practice not only leads to the encouragement of the diseases and pests to which the apple tree is liable, but means the destruction of an animal foodstuff of proved value, it should be avoided wherever possible. To show just what the waste of foodstuff is, we had apples grown at Dingabledinga in 1929-30 analysed in April to show their nutritive value, with the following results:—

*Analysis of Apples, 1929-30.*

|                     | Sample as<br>Received. | Oven Dry<br>Sample. |
|---------------------|------------------------|---------------------|
|                     | %                      | %                   |
| Moisture .....      | 79.00                  | —                   |
| Ash .....           | 0.50                   | 2.38                |
| Protein.....        | 0.31                   | 1.48                |
| Fat .....           | 0.69                   | 3.28                |
| Carbohydrates ..... | 18.21                  | 86.72               |
| Fibre .....         | 1.29                   | 6.14                |
|                     | <u>100.00</u>          | <u>100.00</u>       |

VALUE OF APPLES AS A FOODSTUFF.

As with all other bulky “green” foodstuffs, Apples when fresh contain a lot of water, but this is not a disadvantage for farm livestock, with the possible exception of horses when on heavy work; still it means that these watery articles should always be fed to animals in conjunction with drier and more concentrated foodstuffs. In estimating the feeding value of Apples, it can only be done by comparing them with other foodstuffs of the same type, all of which are fed to animals in admixture with drier foodstuffs, and for the purpose this has been done, and we have taken Turnips, Potatoes, and Sugar Beet, and besides showing the chemical analysis of each, we have also presented the amounts of digestible nutrients and also the *Starch Equivalent* value of all of them.

*Comparison of Apples with Other Well-known Foodstuffs.*

|                   | APPLES.<br>Nutrients. |         | TURNIPS.<br>Nutrients. |         | POTATOES.<br>Nutrients. |         | SUGAR BEET.<br>Nutrients. |         |
|-------------------|-----------------------|---------|------------------------|---------|-------------------------|---------|---------------------------|---------|
|                   | Crude.                | Digest. | Crude.                 | Digest. | Crude.                  | Digest. | Crude.                    | Digest. |
|                   | %                     | %       | %                      | %       | %                       | %       | %                         | %       |
| Moisture .....    | 75.00                 | —       | 75.00                  | —       | 75.00                   | —       | 75.00                     | —       |
| Ash .....         | 0.60                  | —       | 2.06                   | —       | 1.10                    | —       | 0.70                      | —       |
| Protein.....      | 0.37                  | 0.23    | 2.65                   | 1.76    | 2.10                    | 1.10    | 1.30                      | 0.90    |
| Fat .....         | 0.82                  | 0.41    | 0.29                   | 0.14    | 0.10                    | 0.05    | 0.10                      | 0.05    |
| Carbohydrates ..  | 21.67                 | 19.98   | 17.64                  | 16.17   | 21.00                   | 18.90   | 21.40                     | 20.30   |
| Fibre .....       | 1.54                  | 0.47    | 2.35                   | 0.88    | 0.70                    | —       | 1.50                      | 0.50    |
| Starch Equivalent | <u>19.3</u>           |         | <u>14.6</u>            |         | <u>20.0</u>             |         | <u>16.3</u>               |         |

*Note.*—The analyses for Potatoes and Sugar Beet are actual, whereas the figures for Turnips and Apples have been calculated after reducing the moisture content to 75 per cent., to bring all four foodstuffs to the one level.



The *Starch Equivalent* values set out above can be used to compare these foodstuffs when they are to be used for fattening or maintenance purposes, and they show that (a) Apples are almost as good a foodstuff, weight for weight, as are Potatoes with the same moisture content, (b) they are better than Sugar Beet, and (c) are of considerably higher feeding value than Turnips, even after this latter foodstuff has been wilted down to the point where it only contains 75 per cent. of moisture.

#### FEEDING APPLES TO FARM LIVESTOCK.

Fed in conjunction with other more concentrated foodstuffs, Apples should prove very valuable for dairy cows, and should be useful for maintaining and even fattening cattle, sheep, and pigs. In this connection it is suggested that the following daily rations would utilise Apples to full advantage:—

*In-Milk Cows, weighing about 1,000lbs.*

|                    | Daily Milk Yield. |        |        |        |
|--------------------|-------------------|--------|--------|--------|
|                    | 10lbs.            | 20lbs. | 30lbs. | 40lbs. |
|                    | Lbs.              | Lbs.   | Lbs.   | Lbs.   |
| Apples .....       | 12                | 14     | 14     | 14     |
| Hay Chaff .....    | 15                | 15     | 15     | 15     |
| Bran .....         | 5                 | 11     | 15     | 15     |
| Linseed Meal ..... | —                 | —      | 1      | 4      |

*Dry Cows to Calve (per 1,000lbs. live weight):—*

Apples 25lbs., Straw 18lbs., Bran 2lbs.

*Fattening Cattle (per 1,000lbs. live weight):—*

Apples 40lbs., Hay 12lbs., Bran 5lbs.

*Maintenance Ration for Cattle (per 1,000lbs. live weight):—*

Apples 40lbs., Barley or Oat straw 12lbs.

*Fattening Sheep (per 100lbs. live weight):—*

(1) Apples 4lbs., Hay 1lb., Bran  $\frac{1}{2}$ lb. or

(2) Apples 5lbs., Oats  $\frac{1}{2}$ lb., Bran  $\frac{1}{2}$ lb.

*Maintenance Ration for Sheep (per 100lbs. live weight):—*

Apples 4lbs., Barley or Oat straw 1lb.

*Pigs (Breeding sows):—*

Apples 10lbs., Skim-milk 5lbs., Peas 1lb.

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SEVENTH REPORT ON THE PERMANENT FIELD EXPERIMENTS,  
SEASONS 1904-1928.

[By W. R. BIRKS, B.Sc. (Agric.), Principal, and T. A. Cole, D.D.A., Experimentalist.]

(Continued from page 36, August, 1930.)

14. *Crop Rotation Experiments*—continued.

(e) *Fallow-Wheat-Pease-Wheat-Barley*.—This is an extension of the rotation dealt with in the previous paragraph. Barley is again associated with wheat as a stubble crop, and the attempt is made to determine whether one period of fallow can be made to suffice for two wheat crops with a grazed-off pea crop placed between them. This gives three grain crops in five years, together with a fodder crop which should help to counteract the ill effects to the soil to be expected from the intensive system of cropping employed. The cereal crops in this rotation received 2cwts. superphosphate per acre at each seeding and the pea crop 1cwt. The series was commenced in 1911, when the entire area to be used was in fallow. As the second wheat and the barley crops required to be sown on unfallowed land, these crops were not sown in the first year, and there are the results of 11 years to be dealt with in the case of these two as against 12 years of the first wheat crop. The series was closed along with others in 1922. The grazing figures were not recorded, except in the case of the pea crop, until well on in 1916, so that there are the results of only six years' work from which to take mean grazing returns. In the next table are shown the details of crop returns from this rotation for 1916 onwards, together with mean results for 11 or 12 years as the case may be.

TABLE XLVII.—*Showing Crop Returns from Fallow-Wheat-Pease-Wheat-Barley Rotation, 1911-1922.*

| Year.                       | Total Produce. |    |    |            |    |     | Grain Yields. |    |            |    |            |    |    |
|-----------------------------|----------------|----|----|------------|----|-----|---------------|----|------------|----|------------|----|----|
|                             | 1st Wheat.     |    |    | 2nd Wheat. |    |     | 1st Wheat.    |    | 2nd Wheat. |    | Barley.    |    |    |
|                             | T.             | C. | L. | T.         | C. | L.  | Bush.lbs.     |    | Bush. lbs. |    | Bush. lbs. |    |    |
| 1916 .....                  | 2              | 3  | 21 | 1          | 8  | 32  | 22            | 56 | 11         | 27 | 15         | 20 |    |
| 1917 .....                  | 2              | 3  | 67 | 1          | 4  | 5   | 25            | 56 | 19         | 55 | 30         | 21 |    |
| 1918 .....                  | 1              | 3  | 76 | 0          | 16 | 7   | 13            | 52 | 11         | 23 | 5          | 33 |    |
| 1919 .....                  | 0              | 16 | 12 | 0          | 6  | 110 | 12            | 7  | 4          | 27 | 0          | 0  |    |
| 1920 .....                  | 0              | 18 | 33 | 0          | 15 | 23  | 8             | 36 | 7          | 52 | 12         | 13 |    |
| 1921 .....                  | 0              | 16 | 53 | 1          | 13 | 27  | 15            | 2  | 4          | 14 | 8          | 13 |    |
| 1922 .....                  | 1              | 5  | 10 | 0          | 13 | 99  | 10            | 43 | 7          | 47 | 15         |    |    |
| Means for 11 or 12 years .. | 1              | 8  | 8  | 1          | 0  | 17  | 16            | 14 | 10         | 0  | 13         | 49 |    |
| Hay equivalent .....        | 1              | 14 | 26 | 1          | 4  | 64  | —             |    | —          |    | —          |    |    |
| Values .....                | £4             | 5  | 7  | £3         | 1  | 5   | £3            | 13 | 1          | £2 | 5          | 0  |    |
|                             |                |    |    |            |    |     |               |    |            |    | £2         | 1  | 11 |

Before proceeding to the consideration of these results, those from the pea crop, recorded as sheep grazing, are to be noted in the next table along with all other grazing afforded by the rotation. For the fallow grazing the figure previously employed (.25) is again assumed to apply. In each other case the figure represents the equivalent number of sheep which the records show the pasture would have supported for a period of a year.



TABLE XLVIII.—*Showing Grazing Value, as Sheep per Acre for a Year, of Land Available for Stocking in Fallow-Wheat-Pease-Wheat-Barley Rotation, 1917-1922.*

| Year.                                           | Before<br>Fallowing. | Fallow.  | 1st Wheat<br>Stubble. | Pea<br>Crop. | 2nd Wheat<br>Stubble. | Barley<br>Stubble. | Total. |
|-------------------------------------------------|----------------------|----------|-----------------------|--------------|-----------------------|--------------------|--------|
| 1917 .....                                      | ·33                  | ·25      | ·70                   | 1·69         | ·50                   | ·97                | 4·44   |
| 1918 .....                                      | ·00                  | ·25      | ·50                   | 1·15         | ·28                   | ·39                | 2·67   |
| 1919 .....                                      | ·00                  | ·25      | ·58                   | 1·08         | ·58                   | ·64                | 3·13   |
| 1920 .....                                      | ·43                  | ·25      | ·56                   | 2·20         | ·35                   | ·67                | 4·46   |
| 1921 .....                                      | ·00                  | ·25      | ·67                   | 2·22         | ·54                   | ·55                | 4·23   |
| 1922 .....                                      | ·54                  | ·25      | ·92                   | 1·68         | ·58                   | ·48                | 4·45   |
| Means for 6<br>years .....                      | ·22                  | ·25      | ·66                   | 1·67         | ·47                   | ·62                | 3·90   |
| Values at 12s.<br>6d. per sheep<br>per annum... | 2s. 9d.              | 3s. 1½d. | 8s. 3d.               | 20s. 10½d.   | 5s. 10¼d.             | 7s. 9d.            | £2 8 9 |

The results indicated in the tables above are not satisfactory from an economic point of view. In the first place the pea crop has yielded grazing for less than the equivalent of two sheep per acre for a year. From the mean grazing figures recorded in Tables XLI. and XLV. it is apparent that stubble land left out of cultivation for a year might be expected to carry as much stock as this without the expense of putting in a crop. Further, although the mean returns from the first wheat crop are only slightly below normal, the second wheat and barley crop returns are so poor that the costs of cultivation plus rent are not covered in either case. It is not surprising, therefore, to find that the rotation as a whole shows a definite net loss as far as grain returns at least are concerned; working on the hay figures, a small profit can be shown. In the next table will be seen the calculations based on the mean figures recorded in the previous two tables. Although various periods are involved, the discrepancies thus introduced in calculating net returns are probably negligible. Costs of production estimates are based on a scale of figures similar to that previously employed. Thus, 50s. per acre is allowed for wheat growing on fallow, plus 4s. 6d. for the extra hundredweight of superphosphate used in this case, and 35s. for the barley crop with a similar addition of 4s. 6d. The second wheat crop is assumed to cost as much as the barley, and for pease, which are not harvested, the figure of 30s. per acre is adopted.

 TABLE XLIX.—*Showing Gross and Net Monetary Returns from Fallow-Wheat-Pease-Wheat-Barley Rotation, 1911-1922.*

|                                                                           | Grain.<br>£ s. d. | Hay.<br>£ s. d. |
|---------------------------------------------------------------------------|-------------------|-----------------|
| Receipts—                                                                 |                   |                 |
| First wheat crop .....                                                    | 3 13 1            | 4 5 7           |
| Second wheat crop .....                                                   | 2 5 0             | 3 1 5           |
| Barley crop .....                                                         | 2 1 11            | 2 1 11          |
| Grazing .....                                                             | 2 8 9             | 2 8 9           |
| Total receipts per acre for 5 years .....                                 | 10 9 9            | 11 17 8         |
| Expenditure—                                                              |                   |                 |
| Rent at 10s. per acre .....                                               | 2 10 0            | 2 10 0          |
| Costs of cultivation—                                                     |                   |                 |
| First wheat crop (2cwt Super) .....                                       | 2 14 6            | 2 14 6          |
| Pea crop (1cwt. Super) .....                                              | 1 10 0            | 1 10 0          |
| Second wheat crop (2cwt. Super) .....                                     | 1 19 6            | 1 19 6          |
| Barley crop (2cwt. Super) .....                                           | 1 19 6            | 1 19 6          |
| Total expenditure per acre for 5 years .....                              | 10 13 6           | 10 13 6         |
| Difference between Receipts and expenditure per<br>acre for 5 years ..... | 0 3 9 loss.       | 0 4 2 profit    |
| Net result per acre per annum .....                                       | 0 0 9 loss        | 0 4 10 profit   |

It appears then that whatever may be the case in other districts of better rainfall, the attempt to extend the rotation to include more than two crops following a period of fallow has not met with success in this case. Barley gave a definitely remunerative



return in rotation with fallow and wheat (paragraph (d)), but in that case it possibly drew some residual benefit from the fallow. In the longer rotation this residuum, if it exists, is apparently thoroughly exhausted, and even the second wheat crop following pease shows a small loss, on grain returns at least, on the most liberal possible interpretation of the question of costs and prices.

(f) *Fallow-Wheat-Lucerne-Lucerne-Lucerne*.—In this series of plots lucerne seed at the rate of 10lbs. per acre was broadcast and harrowed in immediately after drilling in the wheat plot each year. The lucerne thus came away in the wheat stubble and supplemented the natural growths of herbage in the subsequent three years. The effect it had in increasing the carrying capacity of these plots may be gauged from the figure representing the mean grazing return in the three "pasture" years. This is 2.07 as against 1.75, representing the carrying capacity of pasture consisting of natural growths only in the third year of the fallow-wheat-pasture rotation reported upon in paragraph (d) above. With the limited summer rainfall occurring locally then, lucerne has given a relatively small increase only in grazing returns; an increase which even in three years has been insufficient to cover the cost of the seed used. The rotation as a whole, however, has given quite satisfactory results, as will be shown in the tables following. It is adapted, of course, to conditions in which stock grazing is of more importance than cropping, and the major part of the gross return is consequently shown in the grazing values.

A feature of the crop returns in this series is the relatively high hay yields as compared with grain returns. Thus, although the mean grain yield is practically identical with that recorded in the previous series (paragraph (e)), the hay returns are approximately 8cwts. or 24 per cent. better. This relatively high hay yield is a result no doubt of the supplies of nitrogen and organic matter returned to the soil as a result of the growth of lucerne and the long period of grazing.

The full details of the crop returns are shown in next table.

TABLE L.—*Showing Crop Returns from Fallow-Wheat-Lucerne-Lucerne-Lucerne Rotation, 1914-1922.*

| Year.                  | Grain.     | Total Produce. |    |     |
|------------------------|------------|----------------|----|-----|
|                        | Bush. lbs. | T.             | C. | L.  |
| 1914 .....             | 5 26       | 0              | 9  | 90  |
| 1915 .....             | 17 10      | 2              | 11 | 73  |
| 1916 .....             | 22 47      | 2              | 8  | 7   |
| 1917 .....             | 24 21      | 2              | 6  | 42  |
| 1918 .....             | 14 13      | 1              | 6  | 100 |
| 1919 .....             | 13 52      | 1              | 6  | 5   |
| 1920 .....             | 13 53      | 1              | 5  | 105 |
| 1921 .....             | 12 19      | 1              | 9  | 56  |
| 1922 .....             | 22 10      | 2              | 8  | 26  |
| Means for 9 Years..... | 16 15      | 1              | 14 | 81  |
| Hay equivalent .....   | —          | 2              | 2  | 39  |
|                        | £ s. d.    | £ s. d.        |    |     |
| Values .....           | 3 13 2     | 5 5 10         |    |     |

The grazing returns are shown in detail in the next table. It is to be noted that for the first few years of the experiment not all the plots in respect of which grazing records were made were sown to lucerne, and in these cases the figures below represent the grazing provided by the natural growths on these plots. At most this affects the "third grazing year" plot for three years only, and the discrepancies thus introduced are unimportant. Here, again, the conventional value of .25 has been taken for the fallow grazing.



TABLE LI.—*Showing Grazing Value, as Sheep per Acre for a Year, of Land Available for Stocking in Fallow-Wheat-Lucerne-Lucerne-Lucerne Rotation, 1914-1922.*

| Year.                                        | Before Fallowing. | Fallow.       | Wheat Stubble. | First Grazing Year. | Second Grazing Year. | Third Grazing Year. | Total Grazing for 5 Years. |
|----------------------------------------------|-------------------|---------------|----------------|---------------------|----------------------|---------------------|----------------------------|
| 1914 .....                                   | ·24               | ·25           | ·00            | ·23                 | ·60                  | ·62                 | 1·94                       |
| 1915 .....                                   | ·86               | ·25           | ·62            | 3·76                | 2·47                 | 3·68                | 11·64                      |
| 1916 .....                                   | 1·06              | ·25           | 1·29           | 3·58                | 4·75                 | 4·30                | 15·23                      |
| 1917 .....                                   | ·33               | ·25           | ·71            | 2·90                | 1·81                 | 1·98                | 7·98                       |
| 1918 .....                                   | ·76               | ·25           | ·49            | 1·79                | 1·58                 | 1·72                | 6·59                       |
| 1919 .....                                   | ·00               | ·25           | ·57            | 1·02                | 1·00                 | 1·16                | 4·00                       |
| 1920 .....                                   | 2·01              | ·25           | 1·03           | 2·62                | 2·12                 | 1·90                | 9·93                       |
| 1921 .....                                   | 1·03              | ·25           | ·94            | 1·21                | 1·65                 | 1·43                | 6·51                       |
| 1922 .....                                   | ·96               | ·25           | ·87            | 1·87                | 2·16                 | 1·98                | 8·09                       |
| Means for 9 Years .....                      | ·81               | ·25           | ·72            | 2·11                | 2·02                 | 2·09                | 7·99                       |
| Values at 12s. 6d. per sheep per annum ..... | s. d.<br>10 1½    | s. d.<br>3 1½ | s. d.<br>9 0   | s. d.<br>26 4½      | s. d.<br>25 3        | s. d.<br>26 1½      | £ s. d.<br>4 19 10½        |

The net results of this rotation can now be stated in the usual form, allowing for costs of production at the rates previously adopted, and this is done in the next table. The cost of lucerne seeding is set down as 26s. 8d., reckoning seed worth 2s. 6d. per lb. and allowing 8d. per acre for broadcasting and 1s. for harrowing. The wheat crop received 2cwt. superphosphate.

 TABLE LII.—*Showing Gross and Net Monetary Returns from Fallow-Wheat-Lucerne-Lucerne-Lucerne Rotation, 1914-1922.*

| Receipts—                                                       | Grain. |    |    | Hay. |    |    |
|-----------------------------------------------------------------|--------|----|----|------|----|----|
|                                                                 | £      | s. | d. | £    | s. | d. |
| Wheat .....                                                     | 3      | 13 | 2  | 5    | 5  | 10 |
| Grazing .....                                                   | 4      | 19 | 11 | 4    | 19 | 11 |
| Total receipts per acre for 5 years ....                        | 8      | 13 | 1  | 10   | 5  | 9  |
| Expenditure—                                                    |        |    |    |      |    |    |
| Rent at 10s. per acre .....                                     | 2      | 10 | 0  | 2    | 10 | 0  |
| Cost of production, wheat .....                                 | 2      | 14 | 6  | 2    | 14 | 6  |
| Cost of lucerne seeding .....                                   | 1      | 6  | 8  | 1    | 6  | 8  |
| Total expenditure per acre for 5 years                          | 6      | 11 | 2  | 6    | 11 | 2  |
| Balance of receipts over expenditure per acre for 5 years ..... | 2      | 1  | 11 | 3    | 14 | 7  |
| Net profit per acre per annum .....                             | 0      | 8  | 5  | 0    | 14 | 11 |

The net results of this rotation are thus represented by the figures 9s. 3d. and 15s. 10d., indicating the profit per acre when the wheat crop is treated as grain and hay respectively. These may next be compared with the corresponding figures recorded for other rotations. Fallow-wheat-pasture, when 2cwt. superphosphate was used with the wheat, gave net results represented by the figures 9s. 1d. and 13s. 5d. (paragraph (d)). In that case, however, the period covered was 12 years and included the relatively good seasons of 1911 and 1912. Referring back to the standard fallow-wheat rotation (paragraph (a)), and taking the same series of years (1914-1922), the corresponding figures are found to be 6s. 3d. and 14s. 6d. The rotation including three years of lucerne grazing following a wheat crop has thus given relatively good net results, and it is interesting to note that, with a much reduced outlay in cropping expenses as compared with other rotations quoted, net returns can be thus maintained at a satisfactory level provided the implied livestock values hold good.



(g) *Kale-Barley-Pease-Wheat*.—This was the last of a series of rotations of the type of the "Norfolk Four-course." Two others had been discontinued in 1914 as unsuited to local conditions and the series here dealt with ran from 1915 to 1922 with no more satisfactory results. Both cereal crops received  $\frac{1}{2}$ cwt. nitrate of soda along with the usual dressing of 1cwt. superphosphate. The kale was sown with  $\frac{1}{2}$ cwt. bonedust, and 10 tons per acre of farmyard manure was also applied with this crop. The pease received 1cwt. superphosphate.

The crop and grazing returns are shown in the usual way in the following tables:—

TABLE LIII.—*Showing Crop Returns from Kale-Barley-Pease-Wheat Rotation, 1915-1922.*

| Year.                   | Grain. |    | Wheat.<br>Total Produce. |    |     | Barley. |         |
|-------------------------|--------|----|--------------------------|----|-----|---------|---------|
|                         |        |    | B.                       | L. | T.  |         |         |
| 1915 .....              | 18     | 59 | 2                        | 6  | 1   | 23      | 23      |
| 1916 .....              | 8      | 48 | 1                        | 5  | 10  | 13      | 46      |
| 1917 .....              | 15     | 2  | 2                        | 4  | 33  | 27      | 43      |
| 1918 .....              | 8      | 46 | 0                        | 14 | 68  | 2       | 46      |
| 1919 .....              | 2      | 44 | 0                        | 6  | 46  | 0       | 0       |
| 1920 .....              | 8      | 42 | 0                        | 15 | 20  | 7       | 45      |
| 1921 .....              | 6      | 43 | 0                        | 19 | 105 | 7       | 24      |
| 1922 .....              | 19     | 58 | 1                        | 12 | 13  | 15      | 48      |
| Means for 8 years ..... | 11     | 13 | 1                        | 5  | 51  | 12      | 22      |
| Hay equivalent .....    | —      | —  | 1                        | 11 | 5   | —       | —       |
| Values .....            | £2     | 10 | 6                        | £3 | 17  | 7       | £1 17 4 |

TABLE LIV.—*Showing Grazing Values, as Sheep per Acre for a Year, of Fodder Crops and Cereal Stubbles in Kale-Barley-Pease-Wheat Rotation, 1915-1922.*

| Year.                                        | Kale.          | Barley Stubble. | Pease.         | Wheat Stubble. | Total Grazing for 4 Years. |
|----------------------------------------------|----------------|-----------------|----------------|----------------|----------------------------|
| 1915 .....                                   | 5.44           | .00             | 2.58           | .00            | 8.02                       |
| 1916 .....                                   | 2.94           | .77             | 3.01           | .55            | 7.27                       |
| 1917 .....                                   | 1.87           | .84             | 1.94           | .42            | 5.07                       |
| 1918 .....                                   | 2.30           | .37             | 1.17           | .28            | 4.12                       |
| 1919 .....                                   | 1.05           | 1.11            | 1.28           | .35            | 3.79                       |
| 1920 .....                                   | 2.12           | .67             | 2.02           | .21            | 5.02                       |
| 1921 .....                                   | 1.79           | .69             | 2.29           | .77            | 5.54                       |
| 1922 .....                                   | 2.44           | .83             | 2.09           | .51            | 5.87                       |
| Means for 8 years                            | 2.49           | .66             | 2.05           | .39            | 5.59                       |
| Values at 12s. 6d. per sheep per annum ..... | s. d.<br>31 1½ | s. d.<br>8 3    | s. d.<br>25 7½ | s. d.<br>4 10½ | £ s. d.<br>3 9 10½         |

It will be seen that both wheat and barley mean returns are much below what may be regarded as profitable yields and the grazing returns are insufficient to make up the deficiencies.

Neither the kale nor the pease give returns equivalent to the costs of seeding these crops and the net results of the rotation is a substantial loss, as is shown in the next table. In this the cost of wheat growing on pea stubble is taken to be the same as that for barley (35s. per acre), and to each is added the cost of  $\frac{1}{2}$ cwt. nitrate of soda, 8s. 6d. The cost of putting in the kale (£3 9s. 9d.) is made up of the following items:—Ploughing, cultivation, and drilling, 11s. 6d.; 10 tons of farmyard manure, 50s.;  $\frac{1}{2}$ cwt. bonedust, 4s. 6d.; and seed (1½lbs.), 3s. 9d.



TABLE LV.—*Showing Gross and Net Monetary Returns from Kale-Barley-Pease-Wheat Rotation, 1915-1922.*

| RECEIPTS—                                                 | Grain. |       | Hay. |       |
|-----------------------------------------------------------|--------|-------|------|-------|
|                                                           | £      | s. d. | £    | s. d. |
| Barley .....                                              | 1      | 17 4  | 1    | 17 4  |
| Wheat .....                                               | 2      | 10 6  | 3    | 17 7  |
| Grazing .....                                             | 3      | 9 11  | 3    | 9 11  |
| Total receipts per acre for 4 years                       | 7      | 17 9  | 9    | 4 10  |
| EXPENDITURE—                                              |        |       |      |       |
| Rent at 10s. per acre .....                               | 2      | 0 0   | 2    | 0 0   |
| Cost of production—                                       |        |       |      |       |
| Kale .....                                                | 3      | 9 9   | 3    | 9 9   |
| Barley .....                                              | 2      | 3 6   | 2    | 3 6   |
| Pease .....                                               | 1      | 10 0  | 1    | 10 0  |
| Wheat .....                                               | 2      | 3 6   | 2    | 3 6   |
| Total expenditure per acre for 4 years .....              | 11     | 6 9   | 11   | 6 9   |
| Balance of expenditure over receipts per acre for 4 years | 3      | 9 0   | 2    | 1 11  |
| Loss per acre per annum ....                              | 0      | 17 3  | 0    | 10 6  |

This is by far the most unsatisfactory set of results recorded in this section of the experiments. The defects in the plan of the rotation which have been chiefly responsible for its failure are, probably, firstly the omission of a period of fallow preceding the wheat crop, and secondly the heavy costs involved in the cultivation of fodder crops which, after all, have provided not a great deal more grazing than might be derived from the simple expedient of leaving cereal stubbles undisturbed for a year.

(h) *Fallow-Wheat-Barley and Fallow-Wheat-Oats* (New Series).—These rotations, commenced in 1924, have run for too short a period to allow of definite conclusions being drawn from the results recorded. Moreover, the period covered embraces two seasons (1927 and 1928) in which returns were abnormally low. The results, as far as they go, are shown, however, in the following tables.

TABLE LVI.—*Showing Crop and Grazing Returns from Fallow-Wheat-Barley Rotation, 1924-28.*

| Year.                  | Wheat.         |    |     |        |    |        | Barley. |      | Total<br>Grazing as<br>Sheep per<br>Acre for a<br>Year. |
|------------------------|----------------|----|-----|--------|----|--------|---------|------|---------------------------------------------------------|
|                        | Total Produce. |    |     | Grain. |    | Grain. |         |      |                                                         |
|                        | T.             | C. | L.  | B.     | L. | B.     | L.      |      |                                                         |
| 1924 .....             | 1              | 9  | 3   | 13     | 45 | 24     | 32      | 1.13 |                                                         |
| 1925 .....             | 1              | 19 | 58  | 23     | 11 | 28     | 20      | 1.25 |                                                         |
| 1926 .....             | 1              | 14 | 65  | 15     | 11 | 27     | 15      | 2.07 |                                                         |
| 1927 .....             | 0              | 15 | 102 | 6      | 26 | 6      | 0       | 1.43 |                                                         |
| 1928 .....             | 0              | 13 | 53  | 7      | 50 | 4      | 26      | 1.14 |                                                         |
| Means for 5 years .... | 1              | 6  | 56  | 13     | 17 | 18     | 9       | 1.40 |                                                         |
| Hay equivalent .....   | 1              | 12 | 36  | —      | —  | —      | —       | —    |                                                         |
| Values .....           | £              | s. | d.  | £      | s. | d.     | s.      | d.   |                                                         |
|                        | 4              | 0  | 10  | 2      | 19 | 9      | 17      | 6    |                                                         |



TABLE I.VII.—*Showing Crop and Grazing Returns from Fallow-Wheat-Oats Rotation, 1924-1928.*

| Year.                  | Wheat.         |    |     |        |    |    | Oats.  |      | Total<br>Grazing as<br>Sheep per<br>Acre for a<br>Year. |   |
|------------------------|----------------|----|-----|--------|----|----|--------|------|---------------------------------------------------------|---|
|                        | Total Produce. |    |     | Grain. |    |    | Grain. |      |                                                         |   |
|                        | T.             | C. | L.  | B.     | L. | B. | L.     |      |                                                         |   |
| 1924 .....             | 1              | 0  | 62  | 9      | 32 | 10 | 27     | 1.13 |                                                         |   |
| 1925 .....             | 1              | 17 | 106 | 21     | 32 | 5  | 14     | 1.07 |                                                         |   |
| 1926 .....             | 1              | 14 | 55  | 15     | 42 | 10 | 30     | 1.43 |                                                         |   |
| 1927 .....             | 0              | 14 | 105 | 5      | 7  | 0  | 0      | 1.42 |                                                         |   |
| 1928 .....             | 0              | 9  | 82  | 4      | 16 | 0  | 29     | 1.17 |                                                         |   |
| Means for 5 years .... | 1              | 3  | 60  | 11     | 14 | 5  | 20     | 1.24 |                                                         |   |
| Hay equivalent .....   | 1              | 8  | 79  | —      |    | —  |        | —    |                                                         |   |
|                        |                | £  | s.  | d.     | £  | s. | d.     | s.   | d.                                                      |   |
| Values .....           | 3              | 11 | 9   | 2      | 10 | 0  | 16     | 6    | 15                                                      | 6 |

The net return from the mean yields recorded in the two foregoing tables are summarised in the next table. As 2cwts. of superphosphate were applied at each seeding the corresponding allowance of 4s. 6d. has been made in the cost of production in each case. Otherwise the rates shown are those which have been used in previous tables.

TABLE LVIII.—*Showing Gross and Net Monetary Returns from Fallow-Wheat Barley and Fallow-Wheat-Oats Rotations, 1924-1928.*

|                                                                        | Fallow—Wheat—Barley. |       | Fallow—Wheat—Oats. |       |
|------------------------------------------------------------------------|----------------------|-------|--------------------|-------|
|                                                                        | Grain.               |       | Grain.             |       |
|                                                                        | Hay.                 |       | Hay.               |       |
|                                                                        | £                    | s. d. | £                  | s. d. |
| <i>Receipts.</i>                                                       |                      |       |                    |       |
| Crops—                                                                 |                      |       |                    |       |
| Wheat .....                                                            | 2 19                 | 9     | 2 10               | 7     |
| Barley .....                                                           | 2 14                 | 6     | —                  | —     |
| Oats .....                                                             | —                    | —     | 0 16               | 6     |
| Grazing .....                                                          | 0 17                 | 6     | 0 15               | 6     |
| Total receipts per acre for 3 years                                    | 6 11                 | 9     | 4 2                | 7     |
| <i>Expenditure.</i>                                                    |                      |       |                    |       |
| Rent at 10s. per acre .....                                            | 1 10                 | 0     | 1 10               | 0     |
| Cost of production—                                                    |                      |       |                    |       |
| Wheat crop .....                                                       | 2 14                 | 6     | 2 14               | 6     |
| Barley crop .....                                                      | 1 19                 | 6     | —                  | —     |
| Oat crop .....                                                         | —                    | —     | 1 19               | 6     |
| Total expenditure per acre for 3 years                                 | 6 4                  | 0     | 6 4                | 0     |
| Difference between receipts and expenditure per acre for 3 years ..... | 0 7                  | 9     | 2 1                | 5     |
| Net result per acre per annum .....                                    | 0 2                  | 7     | 0 13               | 10    |
|                                                                        | Profit               |       | Loss               |       |

Little can be said regarding these figures, except that the mean yields recorded, and, consequently, the net returns, are abnormally low; especially is this so with regard to the returns in the rotation including oats. There is, nevertheless, probably some significance in the fact that the rotation including barley has given better results than the other, and, even with the handicap of two abnormally poor seasons in five, a credit balance can still be shown on the basis of calculation adopted.

(i) *Fallow-Wheat-Barley-Grazing and Fallow-Wheat-Oats-Grazing (New Series).*—As with the previous pair of rotations little more can be done than record the actual returns for the five years' currency of these tests. Again 2cwts. superphosphate has been applied at each seeding.



TABLE LIX.—*Showing Crop and Grazing Returns from Fallow-Wheat-Barley-Pasture Rotation, 1924-1928.*

| Year.              | Wheat.         |    |     |        |    | Barley. |    |               | Grazing as Sheep per Acre for a Year. |                |    |    |   |
|--------------------|----------------|----|-----|--------|----|---------|----|---------------|---------------------------------------|----------------|----|----|---|
|                    | Total Produce. |    |     | Grain. |    | Grain.  |    | Pasture Year. | Other Grazing.                        | Total Grazing. |    |    |   |
|                    | T.             | C. | L.  | B.     | L. | B.      | L. |               |                                       |                |    |    |   |
| 1924 .....         | 1              | 9  | 109 | 14     | 24 | 25      | 31 | 1-19          | 1-13                                  | 2-32           |    |    |   |
| 1925 .....         | 1              | 15 | 36  | 17     | 5  | 23      | 18 | 1-12          | 1-81                                  | 2-93           |    |    |   |
| 1926 .....         | 1              | 18 | 36  | 17     | 23 | 26      | 24 | 1-26          | 1-67                                  | 2-93           |    |    |   |
| 1927 .....         | 0              | 17 | 64  | 10     | 50 | 5       | 17 | 1-56          | 1-74                                  | 3-30           |    |    |   |
| 1928 .....         | 0              | 14 | 99  | 6      | 30 | 4       | 11 | 1-03          | 1-15                                  | 2-18           |    |    |   |
| Means for 5 years  | 1              | 7  | 24  | 13     | 24 | 17      | 0  | 1-23          | 1-50                                  | 2-73           |    |    |   |
| Hay equivalent ... | 1              | 13 | 21  | —      |    | —       |    | —             | —                                     | —              |    |    |   |
|                    | £              | s. | d.  | £      | s. | d.      | £  | s.            | d.                                    | £              | s. | d. |   |
| Values .....       | 4              | 3  | 0   | 3      | 0  | 4       | 2  | 11            | 0                                     | 0              | 15 | 5  |   |
|                    |                |    |     |        |    |         |    |               |                                       |                | 0  | 18 | 9 |
|                    |                |    |     |        |    |         |    |               |                                       |                | 1  | 14 | 2 |

TABLE LX.—*Showing Crop and Grazing Returns from Fallow-Wheat Oats-Pasture Rotation, 1924-1928.*

| Year.              | Wheat.         |    |    |        |    |    | Grazing as Sheep per Acre<br>for a Year. |      |                  |                   |                   |    |   |    |    |   |    |    |
|--------------------|----------------|----|----|--------|----|----|------------------------------------------|------|------------------|-------------------|-------------------|----|---|----|----|---|----|----|
|                    | Total Produce. |    |    | Grain. |    |    | Oats                                     |      | Pasture<br>Year. | Other<br>Grazing. | Total<br>Grazing. |    |   |    |    |   |    |    |
|                    | T.             | C. | L. | B.     | L. | B. | L.                                       |      |                  |                   |                   |    |   |    |    |   |    |    |
| 1924 .....         | 1              | 15 | 3  | 15     | 35 | 11 | 15                                       | 1-71 | 1-12             | 2-83              |                   |    |   |    |    |   |    |    |
| 1925 .....         | 2              | 0  | 75 | 22     | 39 | 5  | 33                                       | 1-46 | 1-55             | 3-01              |                   |    |   |    |    |   |    |    |
| 1926 .....         | 1              | 18 | 92 | 16     | 57 | 11 | 30                                       | 1-62 | 1-53             | 3-15              |                   |    |   |    |    |   |    |    |
| 1927 .....         | 0              | 14 | 81 | 7      | 11 | 5  | 22                                       | 1-55 | 1-53             | 3-08              |                   |    |   |    |    |   |    |    |
| 1928 .....         | 0              | 17 | 32 | 9      | 48 | 0  | 25                                       | 1-04 | 1-15             | 2-19              |                   |    |   |    |    |   |    |    |
| Means for 5 years  | 1              | 9  | 34 | 14     | 26 | 7  | 1                                        | 1-48 | 1-37             | 2-85              |                   |    |   |    |    |   |    |    |
| Hay equivalent ... | 1              | 15 | 82 | —      |    |    | —                                        |      | —                | —                 | —                 |    |   |    |    |   |    |    |
|                    | £              | s. | d. | £      | s. | d. | £                                        | s.   | d.               | £                 | s.                | d. |   |    |    |   |    |    |
| Values .....       | 4              | 9  | 4  | 3      | 4  | 11 | 1                                        | 1    | 1                | 0                 | 18                | 6  | 0 | 17 | 1½ | 1 | 15 | 7½ |

The mean yields are again much below College Farm average returns for these crops, though in the oats series they are somewhat better than those recorded in the preceding paragraph. The value of grazing, moreover, in the pasture year exceeds the amount debited as rent for the year. After making calculations similar to those made in connection with Table LVIII., it will be seen that the barley series shows a small net profit, while the oats series is on the border line. The hay figures show a small profit and the grain figures a loss of the same amount.

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TABLE LXI.—*Showing Gross and Net Monetary Returns from Fallow-Wheat-Barley-Pasture and Fallow-Wheat-Oats-Pasture Rotations, 1924-1928.*

| Receipts.<br>Crops—                                                          | Fallow-Wheat-Barley-Pasture<br>Grain. |    |     | Fallow-Wheat-Oats-Pasture<br>Hay. |    |    | Fallow-Wheat-Oats-Pasture<br>Grain. |    |    | Fallow-Wheat-Oats-Pasture<br>Hay. |    |    |
|------------------------------------------------------------------------------|---------------------------------------|----|-----|-----------------------------------|----|----|-------------------------------------|----|----|-----------------------------------|----|----|
|                                                                              | £                                     | s. | d.  | £                                 | s. | d. | £                                   | s. | d. | £                                 | s. | d. |
| Wheat .....                                                                  | 3                                     | 0  | 4   | 4                                 | 3  | 0  | 3                                   | 4  | 11 | 4                                 | 9  | 4. |
| Barley .....                                                                 | 2                                     | 11 | 0   | 2                                 | 11 | 0  | —                                   | —  | —  | —                                 | —  | —  |
| Oats .....                                                                   | —                                     | —  | —   | —                                 | —  | —  | 1                                   | 1  | 1  | 1                                 | 1  | 1  |
| Grazing .....                                                                | 1                                     | 14 | 2   | 1                                 | 14 | 2  | 1                                   | 15 | 8  | 1                                 | 15 | 8  |
| Total receipts per acre for<br>4 years .....                                 | 7                                     | 5  | 6   | 8                                 | 8  | 2  | 6                                   | 1  | 8  | 7                                 | 6  | 1  |
| <b>Expenditure.</b>                                                          |                                       |    |     |                                   |    |    |                                     |    |    |                                   |    |    |
| Rent at 10s. per acre .....                                                  | 2                                     | 0  | 0   | 2                                 | 0  | 0  | 2                                   | 0  | 0  | 2                                 | 0  | 0  |
| Cost of production—                                                          |                                       |    |     |                                   |    |    |                                     |    |    |                                   |    |    |
| Wheat crop .....                                                             | 2                                     | 14 | 6   | 2                                 | 14 | 6  | 2                                   | 14 | 6  | 2                                 | 14 | 6  |
| Barley crop .....                                                            | 1                                     | 19 | 6   | 1                                 | 19 | 6  | —                                   | —  | —  | —                                 | —  | —  |
| Oat crop .....                                                               | —                                     | —  | —   | —                                 | —  | —  | 1                                   | 19 | 6  | 1                                 | 19 | 6  |
| Total expenditure per acre<br>for 4 years .....                              | 6                                     | 14 | 0   | 6                                 | 14 | 0  | 6                                   | 14 | 0  | 6                                 | 14 | 0  |
| Difference between receipts and<br>expenditure per acre for 4<br>years ..... | 0                                     | 11 | 6   | 1                                 | 14 | 2  | 0                                   | 12 | 4  | 0                                 | 12 | 1  |
| Net result per acre per annum.                                               | 0                                     | 2  | 10½ | 0                                 | 8  | 6½ | 0                                   | 3  | 1  | 0                                 | 3  | 0  |
|                                                                              | Profit                                |    |     | Profit                            |    |    | Loss                                |    |    | Profit                            |    |    |

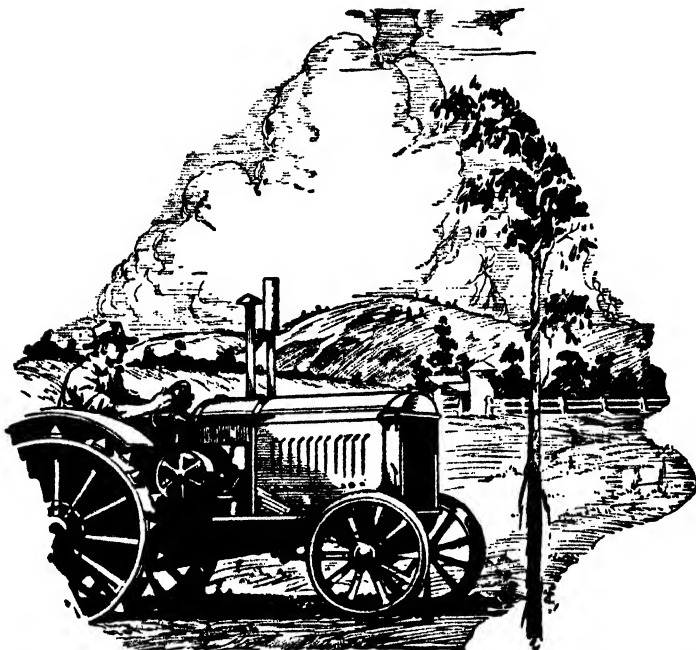
(j) For the purpose of providing a concise statement of comparative net returns derived from the various rotations which have been introduced into the experiments, the figures which have been arrived at in the foregoing paragraphs as representing per acre profit or loss, are brought together in the concluding table of this report. As in the case of the summary of the manurial experiments, different periods are covered by different experiments. In order to provide as reliable a basis of comparison as possible, the returns recorded in the standard Fallow-Wheat rotation have been calculated for various periods, to correspond with those of other tests. It may be noted that the list includes two rotations, Fallow-Wheat-Pasture with dressings of ½cwt. and 3cwts. superphosphate respectively, which have not been previously referred to in the report. The results recorded in these series of plots were not considered of sufficient interest to warrant their statement in detail, but the summary as represented by the figures quoted below is given to complete the record of the work which has been done.

TABLE LXII.—*Summarising the Net Monetary Returns Per Acre from Land Worked Under Various Systems of Crop Rotation.*

| Rotation.                                      | Period. | Annual Net Return per<br>Acre over Whole Area. |                                     |
|------------------------------------------------|---------|------------------------------------------------|-------------------------------------|
|                                                |         | Wheat Crop<br>Harvested<br>for Grain.          | Wheat Crop<br>Harvested<br>for Hay. |
|                                                |         | £ s. d.                                        | £ s. d.                             |
| Fallow-Wheat (1cwt. superphosphate) .....      | 1905-27 | 12 6 profit                                    | 20 6 profit                         |
| Fallow-Wheat (1cwt. superphosphate) .....      | 1908-22 | 11 6 "                                         | 18 11 "                             |
| Sorghum-Wheat .....                            | "       | 3 7 "                                          | 12 5 "                              |
| Fallow-Wheat-Pasture (½cwt. superphosphate) .  | "       | 8 9 "                                          | 15 6 "                              |
| Fallow-Wheat-Pasture (1cwt. superphosphate) .  | "       | 10 6 "                                         | 16 8 "                              |
| Fallow-Wheat-Pasture (2cwts. superphosphate) . | "       | 11 10 "                                        | 17 11 "                             |
| Fallow-Wheat-Pasture (3cwts. superphosphate) . | "       | 11 2 "                                         | 16 6 "                              |
| Fallow-Wheat-Pasture (2cwts. superphosphate) . | 1911-22 | 9 1 "                                          | 13 5 "                              |
| Fallow-Wheat-Barley .....                      | "       | 15 9 "                                         | 18 11 "                             |
| Fallow-Wheat-Lucerne-Lucerne .....             | 1914-22 | 9 3 "                                          | 15 10 "                             |
| Fallow-Wheat (1cwt. superphosphate) .....      | "       | 6 3 "                                          | 14 6 "                              |
| Fallow-Wheat-Pease-Wheat-Barley .....          | 1911-22 | 0 9 loss                                       | 4 10 "                              |
| Kale-Barley-Pease-Wheat .....                  | 1915-22 | 17 3 "                                         | 10 6 loss                           |
| Fallow-Wheat (1cwt. superphosphate) .....      | 1924-27 | 4 9 profit                                     | 6 11 profit                         |
| Fallow-Wheat-Barley .....                      | 1924-28 | 2 7 "                                          | 9 7 "                               |
| Fallow-Wheat-Oats .....                        | "       | 13 10 loss                                     | 6 9 loss                            |
| Fallow-Wheat-Barley-Pasture .....              | "       | 2 10½ profit                                   | 8 6½ profit                         |
| Fallow-Wheat-Oats-Pasture .....                | "       | 3 1 loss                                       | 3 0 "                               |

(Concluded.)





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## REPORT OF THE GOVERNMENT STATIST UPON THE LIVESTOCK STATISTICS OF SOUTH AUSTRALIA FOR THE YEAR 1929.

[By W. L. JOHNSTON, Government Statist.]

I.—*Sheep and Wool*.—1. *Number*.—The sheep flocks on December 31st, 1929, numbered 6,186,252 (7,079,947), decrease 893,695. These were classified as follows:—Ewes, 3,194,504 (3,637,147), decrease 442,643; wethers, 1,854,347 (2,042,651), decrease 188,304; rams, 90,057 (98,447); decrease, 8,390. Under one year old, 1,047,344 (1,301,702), decrease, 254,358.

2. *Breeds of Sheep*.—86.8 (89.9) per cent. of the flocks were returned as pure-bred Merino and 7.0 (5.4) per cent. as Merino Comebacks, 0.7 (0.6) per cent. as other pure breeds (Corriedale, Shropshire, Dorset Horn, Lincoln, Romney Marsh, Southdown, Suffolk, etc.), and the balance, 5.5 (4.1) per cent. were returned as Crossbreeds.

3. *Lambing*, 1929.—During the year 1929 2,778,561 (2,918,594) ewes were mated and 1,231,710 (1,545,438) lambs marked, equal to a percentage of 44.33, compared with 52.95 for the previous year.

4. *Winter Lambing*, 1930.—2,407,000 ewes were reported as either mated or intended to be mated for the Winter Lambing of 1930. In addition, 218,000 ewes were expected to be reserved for Spring Lambing.

5. *Wool Clip*.—6,617,986 (7,247,099) sheep and lambs were shorn, the total clip, including locks, bellies, pieces, &c., being 56,083,898 (63,729,419) lbs., being a decrease of 7,645,521 lbs. The average weight of fleece for sheep and lambs combined was 8.47 (8.79) and for sheep only 9.59 (10.10) lbs.

6. *Total Wool Production*.—Subject to slight revision of fellmongered wool, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported, was 67,300,881 (74,616,004) lbs.; decrease, 7,315,123 lbs.; value, £2,549,021 (£4,654,172); decrease, £2,105,151, the average value per lb. greasy being 9.09d. (14.97d.).

II. *Cattle*.—All kinds, 204,516 (263,016); decrease, 58,500. Dairying cattle, 104,255 (108,969); decrease, 4,714; classified as follows:—In milk 75,574 (76,147), dry 21,219 (24,998), and heifers, springing, 7,462 (7,824). In addition there were 11,726 (10,598) other heifers, one year and over, which are not included in the dairying total, but which are possible additions to the dairying herds.

III. *Horses*.—189,054 (205,865).

IV. *Pigs*.—74,906 (62,723).

V. *Goyder's Line of Rainfall and Livestock*.—During the year 1929 the percentage to the total of sheep outside Goyder's Line of Rainfall fell from 36.50 to 26.48: Cattle 41.87 to 27.02, and Horses 27.44 to 24.89. The numbers within and without the line for 1929 were: Sheep 4,548,246 and 1,638,006, Cattle 149,246 and 55,270, Horses 141,992 and 47,062.

VI. *Interstate Movement by Land of Stock*.—The State gained 39,970 head of Cattle and 299,800 Sheep, and lost 2,552 Horses by transit of stock between States. The total interstate imports were: Sheep 402,348, Cattle 43,592, Horses 910, and exports were: Sheep 102,548, Cattle, 3,622, and Horses 3,462. Net exports of Horses to overseas countries 635.

VII. *Slaughtering*.—Sheep and Lambs 1,242,835 (1,263,352), decrease 20,517, for export 1,568 (32,239); Cattle 117,806 (127,627), decrease 9,821; Pigs 96,449 (98,679), decrease 2,230.

VIII. *Top-dressed Pasture Lands*.—There was an increase during the year of 51,701 acres in the area top-dressed, and of 2,672 tons in the manure used. The respective totals were 302,114 (250,413) acres, Manure used 15,701 (13,029) tons. In addition there were 49,701 acres of pastures previously top-dressed, but not during 1929.



1. LIVESTOCK AS AT DECEMBER 31ST, 1929, IN COMPARISON WITH DECEMBER 31ST, 1928.

| Division.              | Sheep.    |           | Cattle. |         | Horses. | Pigs.  |
|------------------------|-----------|-----------|---------|---------|---------|--------|
|                        | 1928.     | 1929.     | 1928.   | 1929.   | 1929.   | 1929.  |
|                        | No.       | No.       | No.     | No.     | No.     | No.    |
| Central .....          | 1,447,426 | 1,444,896 | 79,113  | 77,718  | 60,024  | 40,065 |
| Lower North .....      | 1,083,550 | 979,607   | 25,927  | 23,282  | 39,516  | 11,369 |
| Upper North .....      | 802,786   | 475,910   | 15,697  | 10,914  | 13,488  | 4,215  |
| South-Eastern .....    | 1,289,436 | 1,419,304 | 31,778  | 32,324  | 13,875  | 7,531  |
| Western .....          | 875,266   | 686,693   | 8,726   | 8,515   | 23,546  | 2,619  |
| Murray Mallee .....    | 461,591   | 424,190   | 20,273  | 18,949  | 28,340  | 9,011  |
| Total Counties .....   | 5,960,055 | 5,430,600 | 181,514 | 171,702 | 178,789 | 74,810 |
| Outside Counties ..... | 1,119,892 | 755,652   | 81,502  | 32,814  | 10,265  | 96     |
| Total State .....      | 7,079,947 | 6,186,252 | 263,016 | 204,516 | 189,054 | 74,906 |
| Increase * .....       | —         | —893,695  | —       | —58,500 | —16,811 | 12,183 |

LIVESTOCK WITHIN AND WITHOUT GOYDER'S LINE OF RAINFALL, 1928 AND 1929.

| Year.                              | Sheep.    |       | Cattle. |       | Horses. |       |
|------------------------------------|-----------|-------|---------|-------|---------|-------|
|                                    | Total.    | %     | Total.  | %     | Total.  | %     |
| Within Goyder's Line of Rainfall.  |           |       |         |       |         |       |
| 1927 .....                         | 4,515,286 | 59.87 | 160,524 | 50.75 | 159,037 | 70.99 |
| 1928 .....                         | 4,495,524 | 63.50 | 152,889 | 58.13 | 149,367 | 72.56 |
| 1929 .....                         | 4,548,246 | 73.52 | 149,246 | 72.98 | 141,992 | 75.11 |
| Without Goyder's Line of Rainfall. |           |       |         |       |         |       |
| 1927 .....                         | 3,027,059 | 40.13 | 155,790 | 49.25 | 64,990  | 29.01 |
| 1928 .....                         | 2,584,423 | 36.50 | 110,127 | 41.87 | 56,498  | 27.44 |
| 1929 .....                         | 1,638,006 | 26.48 | 55,270  | 27.02 | 47,062  | 24.89 |

WOOL PRODUCTION.

| Division.              | Wool Clip. |            |            | Average Weight Fleece. |          |            |
|------------------------|------------|------------|------------|------------------------|----------|------------|
|                        | 1928-29.   | 1929-30.   | *Increase. | 1928-9.                | 1929-30. | *Increase. |
|                        | Lbs.       | Lbs.       | Lbs.       | Lbs.                   | Lbs.     | Lbs.       |
| Central .....          | 12,682,009 | 12,056,568 | —625,441   | 8.96                   | 8.29     | —0.67      |
| Lower North .....      | 9,835,924  | 9,537,395  | —298,529   | 9.18                   | 9.13     | —0.05      |
| Upper North .....      | 8,546,851  | 5,505,442  | —3,041,409 | 9.21                   | 8.80     | —0.41      |
| South-Eastern .....    | 9,970,456  | 10,958,608 | 988,212    | 8.01                   | 8.02     | 0.01       |
| Western .....          | 7,091,457  | 5,311,284  | —1,780,173 | 7.75                   | 7.48     | —0.27      |
| Murray Mallee .....    | 4,159,445  | 4,060,726  | —98,719    | 9.26                   | 8.96     | —0.30      |
| Total Counties .....   | 52,286,142 | 47,430,083 | —4,856,059 | 8.68                   | 8.39     | —0.29      |
| Outside Counties ..... | 11,443,277 | 8,653,815  | —2,789,462 | 9.35                   | 8.98     | —0.37      |
| Total State .....      | 63,729,419 | 56,083,898 | —7,645,521 | 8.79                   | 8.47     | —0.32      |

Grand total wool production (clip, fellmongered, and on skins exported), subject to slight revision, 1928-29, 74,616,004lbs.; 1929-30, 67,300,881lbs.; decrease, 7,315,123lbs.

\* Minus sign (—) denotes decrease.



## ANNUAL REPORT ON PASTURE IMPROVEMENT, KYBYBOLITE. 1929-30.

[By L. J. COOK, R.D.A., Manager.]

The season from a pasture point of view was very good, results secured from some pastures exceeding those of recent seasons, whilst a number of plots yielded record returns in grazing. Plants received a really good start in the Autumn, and had very little check throughout their growing periods. On account of the light Spring rains, however, they did not finish quite as well as of recent years, and this factor spoilt what promised to be an all round record grazing season.

A useful rain was received in January, 1929, but the February and March rains were light, considerably below average. April, however, opened with splendid falls, and record rains were recorded for the month, followed by average falls in May, June, and July. Thus plants were able to make good early growth, and well establish their root systems before cold soil conditions were evident, so that comparatively good feed was available throughout the whole of Winter. Some fairly heavy frosts were recorded during June, but these helped rather than checked grasses and clovers, as they decidedly checked growths of Capeweed that were becoming rather strong in some fields. The rains of August, September, October, and November were all below average so that although the Spring development of pastures was good, they were not as great, or complete as usual. Especially was this noticed on pastures that were grazed to their maximum during Winter and early Spring. Summer rains were light, and consequently there was a longer absence of green picking this summer. The usual summer growth from rooted grasses and plants, such as cat's ear, were poor.

The following table shows the monthly rainfall of recent years, compared with the average for the past 24 seasons:—

|                 | 1926.<br>In. | 1927.<br>In. | 1928.<br>In. | 1929.<br>In. | 1906-29.<br>In. |
|-----------------|--------------|--------------|--------------|--------------|-----------------|
| April .....     | 2.10         | 0.20         | 1.50         | 3.12         | 1.26            |
| May .....       | 3.17         | 2.92         | 2.24         | 2.16         | 2.57            |
| June .....      | 1.24         | 1.63         | 2.53         | 3.32         | 2.85            |
| July .....      | 2.71         | 2.14         | 2.71         | 3.08         | 2.88            |
| August .....    | 3.31         | 4.02         | 0.90         | 1.84         | 2.62            |
| September ..... | 1.79         | 0.91         | 3.12         | 1.75         | 2.67            |
| October .....   | 2.27         | 0.52         | 4.47         | 1.50         | 1.91            |
| November .....  | 0.68         | 2.06         | 0.99         | 0.97         | 1.47            |
| December .....  | 0.83         | 1.31         | 0.17         | 1.66         | 1.13            |
|                 | 1927.        | 1928.        | 1929.        | 1930.        |                 |
| January .....   | 0.51         | 1.59         | 1.35         | 0.02         | 0.53            |
| February .....  | 1.20         | 1.74         | 0.22         | 1.57         | 1.00            |
| March .....     | 0.96         | 0.55         | 0.65         | 0.06         | 0.97            |
| Total .....     | 20.77        | 19.59        | 20.85        | 21.05        | 21.86           |

### THE IMPROVEMENT OF NATURAL PASTURES WITHOUT CULTIVATION.

The work of topdressing natural pastures with phosphatic fertilisers and lime was commenced during 1919, additional plots were started during 1924 and 1926, and a further four were added this season, 1929, to supplement the work being carried out in conjunction with the Waite Research Institute. At present there are 17 plots being utilised for this work, 13 of which are 3½ acres in area, and four are 5 acres each.

Since 1921 careful records of the grazing secured from the plots have been kept. This season the plots have been continuously grazed in rotation by five flocks, constituted according to the estimated carrying capacity, and a separate flock has been used for each type of fertilised pasture. That is A and AA flocks, 20 sheep, have been used



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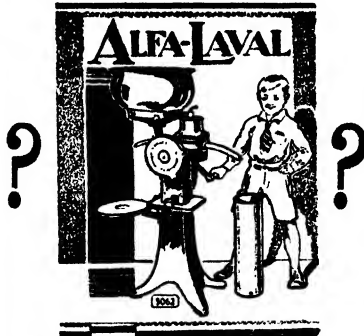
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on unmanured land, 24 acres. B flock of 36 sheep has been used on 14 acres of land improved with superphosphate; O flock of 48 sheep has been used on 17 acres of land improved with lime and superphosphate; whilst D flock of 20 sheep has been used on 10½ acres of land improved with rock phosphates. Similar type and aged sheep have been used in each flock. Through the kind help of the Waite Research Institute we have been able to weigh these sheep monthly, and it is anticipated that some very useful and interesting additional figures will be available in the future.

The following table shows the fertiliser applied, with date, and rate of applications, whilst Table 3 shows the grazing results secured:—

TABLE 2.—*Fertilising of Natural Grazing Test, Kybybolite, 1919-29.*

| Plot. | Total Fertiliser per Acre.                                                                                                                                              | Date and Rate of Application.                                                  |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1     | 1 ton Aluminium Phosphate Rock (412lbs. phosphoric acid) .....                                                                                                          | 1919, one application                                                          |
| 2     | 11cwts. Aluminium Phosphate (227lbs. Phosphoric Acid)<br>6cwts. Aluminium Phosphate (124lbs. Phosphoric Acid)<br>204lbs. 45% Superphosphate (42lbs. Phosphoric Acid) .. | 1919, one application<br>1920-25, 1cwt. per annum<br>1926-29, 5½lbs. per annum |
| 3     | 1 ton Lime (Calcium Carbonate) .....                                                                                                                                    | 1919, one application                                                          |
|       | 1 ton Lime (Calcium Carbonate) .....                                                                                                                                    | 1929, one application                                                          |
|       | 11cwts. 36% Superphosphate (203lbs. Phosphoric Acid)                                                                                                                    | 1919-29, 1cwt. per annum                                                       |
| 4     | 11cwts. Calcium Phosphate Rock (232lbs. Phosphoric Acid) .....                                                                                                          | 1919, one application                                                          |
|       | 6cwts. Calcium Phosphate Rock (127lbs. Phosphoric Acid) .....                                                                                                           | 1920-25, 1cwt. per annum                                                       |
|       | 2cwts. 82% Calcium Phosphate Rock (84lbs. Phosphoric Acid) .....                                                                                                        | 1926-29, ½cwt. Island Phosphate per annum                                      |
| 5     | 1 ton Calcium Phosphate Rock (422lbs. Phosphoric Acid)<br>10cwts. Calcium Phosphate Rock (420lbs. Phosphoric Acid)                                                      | 1919, one application<br>1929, one application                                 |
| 6     | No Manure (Check Plot).                                                                                                                                                 | Island Phosphate Rock                                                          |
| 7     | 540lbs. 45% Superphosphate (111lbs. Phosphoric Acid)                                                                                                                    | 1924-29, 90lbs. per annum                                                      |
| 8     | 720lbs. 45% Superphosphate (148lbs. Phosphoric Acid)                                                                                                                    | 1926-29, 180lbs. per annum                                                     |
| 9     | 1 ton Gypsum (Calcium Sulphate) .....                                                                                                                                   | 1926, one application                                                          |
|       | 448lbs. 45% Superphosphate (92lbs. Phosphoric Acid) ..                                                                                                                  | 1926-29, 1cwt. per annum                                                       |
| 10    | 1 ton Lime (Calcium Carbonate) .....                                                                                                                                    | 1924, one application                                                          |
|       | 672lbs. 45% Superphosphate (138lbs. Phosphoric Acid)                                                                                                                    | 1924-29, 1cwt. per annum                                                       |
| 11    | 6cwts. Ephos Phosphate (188lbs. Phosphoric Acid)....                                                                                                                    | 1924, one application                                                          |
| 12    | No Manure (Check Plot).                                                                                                                                                 |                                                                                |
| 13    | 1 ton Crushed Limestone (Calcium Carbonate).....                                                                                                                        | 1926, one application                                                          |
|       | 448lbs. 45% Superphosphate (92lbs. Phosphoric Acid) ..                                                                                                                  | 1926-29, 1cwt. per annum                                                       |
| 1A    | No Manure (Check Plot).                                                                                                                                                 |                                                                                |
| 2A    | 320lbs. 45% Superphosphate (66lbs. Phosphoric Acid) ..                                                                                                                  | 1929, one application                                                          |
| 3A    | No Manure (Check Plot).                                                                                                                                                 |                                                                                |
| 4A    | No Manure (Check Plot).                                                                                                                                                 |                                                                                |

TABLE 3.—*Returns of Natural Grazing Test, Kybybolite, 1921-29.*

| Year.                                   | Grazing in Sheep per Acre. |         |         |         |         |         |         |         |         |          |          |          |          |
|-----------------------------------------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
|                                         | Plot 1.                    | Plot 2. | Plot 3. | Plot 4. | Plot 5. | Plot 6. | Plot 7. | Plot 8. | Plot 9. | Plot 10. | Plot 11. | Plot 12. | Plot 13. |
| 1921-2 .....                            | 1.52                       | 1.64    | 1.84    | 1.48    | 1.33    | 1.11    | —       | —       | —       | —        | —        | —        | —        |
| 1922-3 .....                            | 1.47                       | 1.41    | 2.06    | 1.20    | 1.27    | 0.83    | —       | —       | —       | —        | —        | —        | —        |
| 1923-4 .....                            | 1.91                       | 1.31    | 2.50    | 1.33    | 1.53    | 0.80    | —       | —       | —       | —        | —        | —        | —        |
| 1924-5 .....                            | 2.72                       | 2.73    | 4.25    | 3.00    | 3.05    | 1.36    | —       | —       | —       | —        | —        | —        | —        |
| 1925-6 .....                            | 1.64                       | 1.58    | 2.92    | 1.78    | 1.71    | 0.71    | 1.13    | —       | —       | 1.54     | 1.27     | 0.81     | —        |
| 1926-7 .....                            | 1.84                       | 1.66    | 3.81    | 1.59    | 1.84    | 0.56    | 1.91    | 1.27    | 0.98    | 1.78     | 1.67     | 0.99     | 1.99     |
| 1927-8 .....                            | 1.95                       | 1.98    | 2.58    | 1.74    | 1.98    | 0.68    | 1.79    | 1.84    | 1.50    | 2.16     | 1.89     | 0.97     | 1.86     |
| 1928-9 .....                            | 1.61                       | 2.63    | 3.24    | 2.24    | 2.30    | 0.66    | 2.42    | 2.06    | 2.08    | 3.60     | 2.17     | 0.58     | 2.54     |
| 1929-30 .....                           | 1.11                       | 2.40    | 3.73    | 1.38    | 1.62    | 0.86    | 2.36    | 2.15    | 1.95    | 2.42     | 1.85     | 1.05     | 2.52     |
| Means 1921-30 ....                      | 1.75                       | 1.93    | 2.99    | 1.75    | 1.85    | 0.84    | —       | —       | —       | —        | —        | —        | —        |
| 1925-30 ....                            | 1.63                       | 2.05    | 3.26    | 1.75    | 1.89    | 0.69    | 1.92    | —       | —       | 2.30     | 1.77     | 0.88     | —        |
| 1926-30 ....                            | 1.63                       | 2.17    | 3.34    | 1.74    | 1.93    | 0.69    | 2.12    | 1.70    | 1.63    | 2.49     | 1.89     | 0.90     | 2.23     |
| Increase above no manure—               | 0.91                       | 1.09    | 2.15    | 0.91    | 1.01    | —       | 1.04    | 0.80    | 0.73    | 1.42     | 0.89     | —        | 1.33     |
| Increase above phosphate dressed plots— | —                          | —       | 1.17    | —       | —       | —       | —       | —       | 0.07    | 0.46     | —        | —        | 0.53     |

In commenting on the above results, it is necessary to state that although all plots were grazed as uniformly as possible, they were not completely grazed throughout the season, and a lot of feed was still available at the close of the grazing year, March 31st, 1930. The season for this class of pasture was comparatively good, and the feed



produced was greater than the flocks required. However, this extra feed will be required and utilised by the flocks during April and May, 1930, and will appear in the results for the coming season.

In comparing the six plots that have now provided results for nine consecutive seasons, the four dressed with phosphatic fertiliser only, have increased the carrying capacity approximately 1 sheep per acre, or 117 per cent. above that of the check plot; whilst the lime and phosphate dressed plot has increased 2.15 sheep per acre, or 256 per cent. above the No Manure Plot, and 1.17 sheep per acre, or 119 per cent. above the phosphate only dressed plots.

We have not been successful in our endeavors to secure a further supply of aluminium rock phosphate, consequently Plot No. 1, which was due for a further application this year, is feeling the need of more fertiliser, as shown by the low carrying capacity of 1.11 sheep per acre.

The addition of a small quantity of water soluble phosphate to Plot No. 2 is continuing to give an increased carrying capacity, and although of recent years this plot has only received half the quantity of phosphoric acid that has been given to Plot No. 4, its growth of pasture has been better. This result has possibly been helped by the mild winters, the wetter seasons being more helpful in dissolving the phosphorus contained in rock phosphate.

In considering Plots Nos. 7, 10, 11, and 12 from which five seasons' grazings have now been obtained, we find that No. 7, dressed with water soluble phosphate, has increased the carrying capacity 1.04 sheep per acre, or 118 per cent. on that of the check plot No. 12. Plot No. 11, dressed with citrate and acid soluble phosphate, has increased 0.89 sheep per acre, or 101 per cent.; whilst Plot No. 10, dressed with lime as well as water soluble phosphate, has increased 1.42 sheep per acre, or 161 per cent. above No Manure, and 0.38 sheep, or 20 per cent. above No. 7, the water soluble phosphate dressed plot.

In comparing Plots Nos. 8, 9, 12, and 13, from which four seasons' grazing are available, we find that Plot 8, dressed with water soluble phosphate, has increased 0.80 sheep per acre, or 88 per cent. on the check plot. Plot No. 9, dressed with gypsum and water soluble phosphate, has increased 0.73 sheep per acre, or 81 per cent.; and Plot No. 13, dressed with crushed limestone and water soluble phosphate, has increased 1.33 sheep per acre, or 148 per cent. on the No Manure Plot.

The gypsum, therefore, has not shown quite equal to the phosphate only plot, whereas the crushed limestone has so far shown an increase above the latter of 0.53 sheep per acre, or 31 per cent.

One important factor showing is the gradual improving effect of fertilisers on the natural pastures. For instance, plots dressed with water soluble phosphate the first year of application increase the yield 34 per cent.; the first two years the increase is 53 per cent.; the first three years it is 84 per cent.; the first four years it is 115 per cent.; whilst the first five years it shows at 118 per cent., showing clearly that to secure success from topdressing with water soluble phosphates annual application should be given continuously.

On account of the varying dates of commencing plots it is difficult as yet to get an even result of the various forms of fertiliser, but by comparing the averages of all plots for the past four seasons a reasonable comparison can be shown, as follows:—

Check plots have carried 0.81 sheep per acre.

Water soluble phosphate plots have carried 1.91 sheep per acre, or 136 per cent. increase over No Manure.

Citrate soluble phosphate plot has carried 1.89 sheep per acre, or 133 per cent. increase over No Manure.

Acid soluble phosphate plots have carried 1.77 sheep per acre, or 119 per cent. increase over No Manure.

Lime and water soluble phosphate plots have carried 2.84 sheep per acre, or 251 per cent. increase over No Manure, and 49 per cent. increase over water soluble phosphate.



Limestone and water soluble phosphate plot has carried 2.23 sheep per acre, or 175 per cent. increase over No Manure, and 17 per cent. increase over water soluble phosphate.

Gypsum and water soluble phosphate plot has carried 1.63 sheep per acre, or 101 per cent. over No Manure.

### SOWN PASTURES.

#### SUBTERRANEAN CLOVER AND WIMMERA RYE GRASS.

The 15 plots of this pasture mixture, established during 1924, are being maintained and fully grazed each season. This year they were again grazed monthly in rotation, using 200 ewes, divided into four flocks, on the 70 acres of plots. General grazing was commenced early in May, and continued incessantly until March 31st, 1930, when the bulk of the feed on the plots was consumed, although sufficient was still available to carry the ewes through April until the new season's feed had developed. Rye grass was still prominent, especially during the winter months, on plots that have been well fertilised with phosphates, and Subterranean Clover made good growth, although some of the plots did not finish as well as they have done in recent years. Particularly was this the case with plots fertilised with acid soluble phosphate.

The following table shows the fertiliser given to the various plots, with rate and time of application, together with the grazing results for the past five seasons, from the plots individually, and from the 70½ acres collectively.

TABLE 4.—Fertiliser Test on Subterranean Clover and Wimmera Rye Grass, Kybybolite, 1925-30.

| Plot. | Manuring per Acre.                                                                                                                         | Sheep per Acre per Year. |         |         |         |          |                  |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------|---------|---------|----------|------------------|
|       |                                                                                                                                            | 1925-6.                  | 1926-7. | 1927-8. | 1928-9. | 1929,30. | 1925-30<br>Mean. |
| 1     | 1cwt. Tetrphosphate annually,<br>1923-1929 .....                                                                                           | 2.76                     | 3.53    | 2.15    | 2.89    | 3.25     | 2.92             |
| 2     | 5cwts. Tetrphosphate, 1923 ....                                                                                                            | 2.76                     | 3.15    | 2.10    | 2.66    | 2.89     | 2.71             |
| 3     | 10cwts. Lime, 1923; 1cwt. Tetra-<br>phosphate annually, 1923-7;<br>1 ton Gypsum, 1928; 1cwt.<br>45% Superphosphate, 1928<br>and 1929 ..... | 2.47                     | 2.97    | 2.63    | 4.27    | 4.40     | 3.35             |
| 4     | 90lbs. 45% Super. annually,<br>1923-29 .....                                                                                               | 3.12                     | 3.72    | 3.06    | 3.90    | 4.52     | 3.66             |
| 5     | 5cwts. 36% Super., 1923; 180lbs.<br>45% Super., 1928 and 1929 ...                                                                          | 3.06                     | 3.21    | 2.06    | 4.35    | 5.37     | 3.61             |
| 6     | No Manure, 1923-26; 45lbs. 45%<br>Super. annually, 1927-29 .....                                                                           | 1.81                     | 1.88    | 2.70    | 2.73    | 2.55     | 2.33             |
| 7     | 1 ton Lime, 1924; 1cwt. 45%<br>Super. annually, 1924-29 .....                                                                              | 3.04                     | 3.70    | 3.28    | 3.96    | 4.52     | 3.70             |
| 8     | 6cwts. 61% Ephos Phosphate,<br>1924 .....                                                                                                  | 3.32                     | 3.95    | 3.92    | 3.75    | 3.77     | 3.74             |
| 9     | No Manure (Check Plot).....                                                                                                                | 2.13                     | 1.95    | 1.94    | 1.20    | 1.16     | 1.68             |
| 10    | 4cwts. 82% Island Phosphate,<br>1924, and 4cwts. 82% Island<br>Phosphate, 1929 .....                                                       | 3.02                     | 3.79    | 3.01    | 2.49    | 2.75     | 3.01             |
| 11    | 4cwts. 82% Island Phosphate,<br>1924, and 1cwt. 45% Super.,<br>1924 .....                                                                  | 3.62                     | 3.68    | 3.76    | 3.88    | 2.70     | 3.53             |
| 12    | 37lbs. 90% Potaash annually,<br>1924-29 .....                                                                                              | 2.60                     | 2.68    | 1.99    | 2.25    | 2.13     | 2.33             |
| 13    | 37lbs. 90% Potash annually,<br>1924-29; 4cwts. 82% Island<br>Phosphate, 1924 and 4cwts.<br>82% Island Phosphate, 1929..                    | 3.27                     | 3.69    | 3.40    | 3.62    | 3.34     | 3.46             |
| 14    | 6cwts. Bone Manure (33%), 1924,<br>and 1cwt. 45% Super., 1924..                                                                            | 3.13                     | 2.68    | 3.07    | 2.98    | 2.67     | 2.91             |
| 15    | 1cwt. 45% Super. annually, 1924-<br>29 .....                                                                                               | 3.51                     | 4.14    | 3.71    | 4.05    | 4.32     | 3.95             |
|       | Means .....                                                                                                                                | 2.92                     | 3.26    | 2.88    | 3.25    | 3.32     | 3.13             |



In commenting on the above table, it is to be noted that some very high yields have been received. Plot 5, in carrying 5.37 sheep per acre, is a sheep to the acre better than any previous result obtained. This plot has received a dressing of 180lbs. 45 per cent. superphosphate during each of the last two Autumns, and has been the most productive plot for both years. Plots Nos. 4 and 7 also gave very fine results, with 4.52 sheep per acre each; whilst Nos. 3 and 15 were almost as good with 4.40 and 4.32 sheep respectively. All of these plots have been fertilised with superphosphate, whilst Nos. 7 and 3 have received lime and gypsum as well. Plot No. 8, dressed with Ephos phosphate, with 3.77 sheep per acre, also yielded well above the average.

For five seasons Plot No. 15, dressed with 1cwt. 45 per cent. superphosphate annually, has given the greatest result, having averaged 3.95 sheep per acre for the whole period. Plot 8, a most consistent yielder, is second, with 3.74 sheep per acre, and Plot 7, dressed with lime and superphosphate, is close up with an average of 3.70 sheep.

The average results of the principal plots are compared below in order of merit.

|    |                                                                                              | Increase above no<br>manure. |                 |           |
|----|----------------------------------------------------------------------------------------------|------------------------------|-----------------|-----------|
|    |                                                                                              | Sheep per Acre.              | Sheep per Acre. | Per Cent. |
| 1  | Annual dressing of 180lbs. 45% Super. (two years) ..                                         | 4.86                         | 3.18            | 189.3     |
| 2  | Single dressing of 1 ton Gypsum and annual dressing<br>of 1cwt. 45% Super. (two years) ..... | 4.33                         | 2.65            | 157.7     |
| 3  | Annual dressing of 1cwt. 45% Super. ....                                                     | 3.95                         | 2.27            | 135.1     |
| 4  | Single dressing of 6cwt. Ephos Phosphate .....                                               | 3.74                         | 2.06            | 122.6     |
| 5  | Single dressing of 1 ton Lime and Annual Dressing of<br>1cwt. 45% Super. ....                | 3.70                         | 2.02            | 120.2     |
| 6  | Annual dressing of 90lbs. 45% Super. ....                                                    | 3.66                         | 1.98            | 117.9     |
| 7  | Single dressing of 4cwt. Island Phosphate and 1cwt.<br>45% Super. ....                       | 3.53                         | 1.85            | 110.1     |
| 8  | Single dressing of 4cwt. Island Phosphate and Annual<br>Dressing of Potash .....             | 3.46                         | 1.78            | 106.0     |
| 9  | Dressing of 4cwt. Island Phosphate every five years                                          | 3.01                         | 1.33            | 79.2      |
| 10 | Annual dressing of 45lbs. 45% Super. (three years)..                                         | 2.66                         | 0.98            | 58.3      |
| 11 | Annual dressing of 37lbs. Potash .....                                                       | 2.33                         | 0.58            | 38.7      |

#### SUBTERRANEAN CLOVER.

A number of comparatively large fields have now been established for some years with Subterranean Clover, and a few with Wimmera Rye Grass included.

Manurial dressings have been phosphatic, and some of the fields have been limed in the past. The grazing of fields has not been complete in every case, as certain fields have necessarily had to be reserved for late Autumn feed each season, but the following table shows the grazing taken from these fields during the last six seasons, and is of interest when compared with other forms of pasture.

TABLE 5.—Subterranean Clover Grazing, Kybybolite, 1924-30.

| Season.       | No. of<br>Fields. | Area.<br>Acres. | Total Feed<br>Days. | Sheep per<br>Acre. |
|---------------|-------------------|-----------------|---------------------|--------------------|
| 1924-5 .....  | 1                 | 29.50           | 29,469              | 2.74               |
| 1925-6 .....  | 3                 | 109.00          | 100,794             | 2.53               |
| 1926-7 .....  | 5                 | 181.50          | 141,041             | 2.13               |
| 1927-8 .....  | 6                 | 231.80          | 208,635             | 2.47               |
| 1928-9 .....  | 7                 | 267.66          | 234,378             | 2.40               |
| 1929-30 ..... | 7                 | 263.71          | 220,071             | 2.29               |
|               |                   | 1,083.17        | 934,388             | 2.36               |

#### RYE GRASSES AND ALSIKE CLOVER.

Trials with both Perennial and Italian Rye Grasses with Alsike Clover have been continued in the six-course rotation of two-acre fields, and of recent years better results have been obtained from Perennial Rye than from the Italian. We now have seven



seasons' results, which are shown in the accompanying table, and so far the results gained have not been outstanding. Except that some advantage is available through having a quick response from summer rains, the yearly grazing results are not as good as those obtained from ordinary arable land left out for grass, and top dressed.

TABLE 6.—*Grazing of Rye Grasses and Alsike Clover, Kybybolite, 1923-30.*

| Field.       | Season.      | Area.<br>Acres. | Total Sheep<br>Days. | Sheep per<br>Acre. |
|--------------|--------------|-----------------|----------------------|--------------------|
| No. 9F ..... | 1923-24..... | 1.94            | 1,563                | 2.14               |
| No. 9F ..... | 1924-25..... | 1.94            | 1,414                | 2.00               |
| No. 9F ..... | 1925-26..... | 1.94            | 792                  | 1.12               |
| No. 9E ..... | 1924-25..... | 1.94            | 838                  | 1.18               |
| No. 9E ..... | 1925-26..... | 1.94            | 942                  | 1.33               |
| No. 9D ..... | 1925-26..... | 1.94            | 696                  | 0.98               |
| No. 9D ..... | 1926-27..... | 1.94            | 1,628                | 2.30               |
| No. 9C ..... | 1926-27..... | 1.94            | 1,037                | 1.47               |
| No. 9C ..... | 1927-28..... | 1.94            | 1,065                | 1.50               |
| No. 9C ..... | 1928-29..... | 1.94            | 2,067                | 2.92               |
| No. 9B ..... | 1927-28..... | 1.94            | 444                  | 0.63               |
| No. 9B ..... | 1928-29..... | 1.94            | 1,210                | 1.71               |
| No. 9A ..... | 1928-29..... | 1.94            | 1,399                | 1.98               |
| No. 9A ..... | 1929-30..... | 1.94            | 863                  | 1.22               |
| No. 9F ..... | 1929-30..... | 1.94            | 902                  | 1.27               |
|              |              | 29.10           | 16,860               | 1.59               |

In handling the above pasture, it has been treated purely as a temporary pasture of two, and a few cases of three, seasons' duration, and it is to be noted that its average on its first year's grazing for seven seasons has been 1.38 sheep per acre. On its second year's grazing for six seasons its average has been 1.67 sheep. Twice it has been left for a third season, when its average has been 2.02 sheep per acre.

#### TOP DRESSING OLD CULTIVATED LAND.

For the past five years fair areas of land, that have been cultivated for a period of from 15 to 20 years, have been left out of the cropping areas, and to enhance their grazing they have been topdressed annually with 1cwt. superphosphate per acre, but no grasses or clovers have been sown. This has had the effect of greatly increasing the growths of naturalised grasses and clovers. The following table summarises the grazing received from this class of pasture each year:—

TABLE 7.—*Grazing of Top-Dressed Old Cultivated Land, Kybybolite, 1925-30.*

| Season.       | No. of Fields. | Area.<br>Acres. | Total Feed<br>Days. | Sheep per Acre. |
|---------------|----------------|-----------------|---------------------|-----------------|
| 1925-26 ..... | 1              | 50.00           | 30,097              | 1.65            |
| 1926-27 ..... | 4              | 140.47          | 68,764              | 1.34            |
| 1927-28 ..... | 3              | 102.47          | 76,196              | 2.04            |
| 1928-29 ..... | 3              | 121.07          | 102,089             | 2.31            |
| 1929-30 ..... | 4              | 151.83          | 144,242             | 2.60            |
|               |                | 565.84          | 421,488             | 2.04            |

Similar land left out of cultivation, but not topdressed, has during the past two seasons only carried 1.10 sheep per acre.

As a comparison to the above, the following two tables are included to show the grazing received from similar land that has never been cultivated.

Table 8 shows the combined results of all such land that has been topdressed, whilst Table 9 shows the results from a fair area of unimproved natural land—that is, land that has neither been cultivated or topdressed.



TABLE 8.—*Grazing of Improved Natural Land by Topdressing Only, Kybybolite, 1921-30.*

| Season.       | No. of Plots. | Area.<br>Acres. | Total Feed<br>Days. | Sheep per Acre. |
|---------------|---------------|-----------------|---------------------|-----------------|
| 1921-22 ..... | 5             | 17.5            | 9,971               | 1.56            |
| 1922-23 ..... | 5             | 17.5            | 9,458               | 1.48            |
| 1923-24 ..... | 5             | 17.5            | 10,949              | 1.71            |
| 1924-25 ..... | 6             | 21.0            | 21,859              | 2.85            |
| 1925-26 ..... | 8             | 31.0            | 18,874              | 1.67            |
| 1926-27 ..... | 11            | 43.0            | 28,948              | 1.84            |
| 1927-28 ..... | 11            | 43.0            | 29,765              | 1.90            |
| 1928-29 ..... | 11            | 43.0            | 38,880              | 2.48            |
| 1929-30 ..... | 12            | 46.5            | 35,261              | 2.08            |
|               |               | 280.0           | 203,965             | 2.00            |

TABLE 9.—*Grazing of Unimproved Natural Land, Kybybolite, 1921-30.*

| Season.       | No. of Fields. | Area.<br>Acres. | Total Feed<br>Days. | Sheep per Acre. |
|---------------|----------------|-----------------|---------------------|-----------------|
| 1921-22 ..... | 2              | 116.5           | 33,324              | 0.78            |
| 1922-23 ..... | 2              | 116.5           | 28,180              | 0.66            |
| 1923-24 ..... | 2              | 116.5           | 17,343              | 0.41            |
| 1924-25 ..... | 2              | 116.5           | 28,431              | 0.67            |
| 1925-26 ..... | 3              | 88.5            | 23,711              | 0.73            |
| 1926-27 ..... | 3              | 61.5            | 15,725              | 0.70            |
| 1927-28 ..... | 3              | 44.5            | 16,887              | 1.04            |
| 1928-29 ..... | 2              | 8.5             | 1,912               | 0.62            |
| 1929-30 ..... | 5              | 19.0            | 5,407               | 0.78            |
|               |                | 688.0           | 170,920             | 0.68            |

In summarising the grazing results of the Farm, the areas under the different treatments have been collected, and averaged over the various periods during which they have been in use, and are tabulated as follows:—

TABLE 10.—*Summary of Grazing Results at Kybybolite.*

| Type of Grazing.                               | No. of<br>Years<br>Tested. | Area.<br>Acres. | Sheep<br>per<br>Acre<br>per<br>Annum. | Increase Over<br>No Manure.<br>Sheep. Per cent. |
|------------------------------------------------|----------------------------|-----------------|---------------------------------------|-------------------------------------------------|
| 1. Subt. Clover and Wimmera Rye Grass (expl.)  | 5                          | 70.5            | 3.13                                  | 2.45                                            |
| 2. Subt. Clover (large fields) .....           | 6                          | 180.53          | 2.36                                  | 1.68                                            |
| 3. Topdressed old cultivated land .....        | 5                          | 113.17          | 2.04                                  | 1.36                                            |
| 4. Improved Natural Land (topdressing only) .. | 9                          | 31.11           | 2.00                                  | 1.32                                            |
| 5. Rye Grass and Alsike Clover .....           | 7                          | 4.16            | 1.59                                  | 0.91                                            |
| 6. Crimson and other Annual Clovers .....      | 8                          | 9.48            | 1.44                                  | 0.76                                            |
| 7. Non-topdressed old cultivated land .....    | 2                          | 75.49           | 1.10                                  | 0.42                                            |
| 8. Improved natural land .....                 | 9                          | 76.44           | 0.68                                  | —                                               |

The above results can be looked upon as a fair comparison, although it must be noted that it has not been practical to fully graze all the larger fields, especially amongst those in items 2, 3, and 7. However, as they are averaged over a number of seasons, the table is useful and interesting, and shows the advantages to be gained from Subterranean Clover, Wimmera Rye Grass, and topdressing with phosphates.

#### SOWN WINTER GRASSES.

Three additional five-acre plots have been established this year, one each with Wimmera Rye Grass, Perennial Rye Grass, and *Phalaris minor*. These, with *Phalaris bulbosa*, have so far given best promise in small plots towards producing Winter feed, and were established on well-prepared virgin fallow land. Good stands were obtained by sowing 8lbs. seed per acre for the Rye Grasses and 2lbs. *Phalaris minor*, with 1cwt. 45 per cent. superphosphate per acre.

It is anticipated to also establish a plot with *Phalaris bulbosa*, fence the plots, and secure grazing figures of these grasses in future seasons.

#### NITROGEN FERTILISER TEST.

Further work has been commenced in conjunction with the Nitrogen Fertilisers Limited, to test the complete fertilisation of Subterranean Clover and Rye Grass pasture,



combined with intensive grazing by the milking herd. Two four-acre plots were established late this year, and six more are being prepared for the coming season. They will all be well manured with phosphates, and half will be given nitrogen fertiliser as well, with the idea mainly of increasing the winter growths and, if possible, extending the growing period of the pastures. Of the two plots established this year, the one dressed with lewt of sulphate of ammonia per acre in August gave an immediate response in increased growth of grasses present.

## LAKE ALBERT HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR JULY, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                           | Butterfat.            |                      |                           | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|---------------------------|-----------------------|----------------------|---------------------------|---------------|
|          |                              |                              | Per Herd during July. | Per Cow during July. | Per Cow December to July. | Per Herd during July. | Per Cow during July. | Per Cow December to July. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                      | Lbs.                  | Lbs.                 | Lbs.                      | %             |
| 6/B ...  | 19-26                        | 13-87                        | 8,151½                | 423-23               | 2,286-17                  | 341-52                | 17-73                | 101-20                    | 4-19          |
| 6/C ...  | 26                           | 22-84                        | 18,228                | 701-08               | 3,798-43                  | 705-74                | 27-14                | 180-80                    | 3-87          |
| 6/E ...  | 21                           | 16-39                        | 8,022½                | 382-02               | 2,574-83                  | 302-94                | 14-43                | 104-75                    | 3-78          |
| 6/F ...  | 21-42                        | 20-42                        | 18,228                | 850-07               | 3,986-75                  | 884-94                | 41-31                | 187-30                    | 4-85          |
| 6/I ...  | 18                           | 11-45                        | 5,523                 | 306-83               | 2,423-22                  | 221-75                | 12-32                | 105-02                    | 4-01          |
| 6/Q ...  | 23                           | 17-58                        | 9,142                 | 397-48               | 3,379-75                  | 440-60                | 19-16                | 164-67                    | 4-82          |
| 6/R ...  | 21-48                        | 17-71                        | 9,902½                | 461-01               | 2,090-03                  | 522-91                | 24-34                | 114-14                    | 5-28          |
| 6/U ...  | 26                           | 18-26                        | 5,851½                | 225-06               | 1,980-01                  | 246-86                | 9-49                 | 84-80                     | 4-22          |
| 6/W ...  | 23-84                        | 18-97                        | 11,526                | 483-47               | 3,768-77                  | 565-09                | 23-70                | 183-90                    | 4-90          |
| 6/X ...  | 26                           | 19-87                        | 14,066½               | 541-02               | 6,390-07                  | 568-40                | 21-86                | 255-16                    | 4-04          |
| 6/Y ...  | 20-23                        | 11-29                        | 7,864½                | 388-75               | 3,051-55                  | 357-49                | 17-67                | 132-26                    | 4-55          |
| 6/BB ... | 18                           | 10-39                        | 4,055½                | 225-31               | 1,886-14                  | 181-09                | 10-06                | 86-63                     | 4-46          |
| 6/DD ... | 31                           | 21                           | 12,587½               | 402-21               | 3,519-18                  | 565-99                | 18-08                | 156-99                    | 4-50          |
| 6/EE ... | 45-35                        | 33-65                        | 17,473                | 884-06               | 4,268-32                  | 756-08                | 16-61                | 191-81                    | 4-32          |
| 6/FF ... | 26-58                        | 14-56                        | 7,648                 | 287-73               | 3,057-84                  | 356-50                | 13-41                | 137-94                    | 4-66          |
| 6/II ... | 33-13                        | 24-74                        | 13,867½               | 403-48               | 4,754-59                  | 625-38                | 18-88                | 216-96                    | 4-68          |
| 6/JJ ... | 19-58                        | 17-55                        | 9,405½                | 480-36               | 4,665-74                  | 450-10                | 22-99                | 218-01                    | 4-79          |
| 6/KK ... | 25-74                        | 22-81                        | 10,438                | 405-51               | 4,658-92                  | 472-61                | 18-36                | 205-61                    | 4-53          |
| 6/LL ... | 25-03                        | 20-16                        | 10,477½               | 418-59               | 4,382-29                  | 412-94                | 16-50                | 183-47                    | 3-94          |
| 6/MM ... | 16                           | 14-16                        | 8,496½                | 531-03               | 3,426-06                  | 389-85                | 24-37                | 164-90                    | 4-59          |
| 6/NN ... | 19                           | 18-81                        | 6,083                 | 320-16               | 2,811-82                  | 303-40                | 15-97                | 128-54                    | 4-99          |
| 6/OO ... | 19-03                        | 14-52                        | 7,525                 | 395-43               | 4,170-63                  | 327-97                | 17-23                | 188-02                    | 4-36          |
| Means    | 23-85                        | 18-23                        | 10,184-68             | 427-06               | 3,594-50                  | 454-55                | 19-06                | 161-58                    | 4-46          |

## NARRUNG HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR JULY, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                          | Butterfat.            |                      |                          | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|--------------------------|-----------------------|----------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during July. | Per Cow during July. | Per Cow October to July. | Per Herd during July. | Per Cow during July. | Per Cow October to July. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                     | Lbs.                  | Lbs.                 | Lbs.                     | %             |
| 5/C ...  | 30                           | 26-23                        | 14,026½               | 467-55               | 4,717-40                 | 720-41                | 24-01                | 237-17                   | 5-14          |
| 5/D ...  | 29                           | 25-97                        | 16,280½               | 561-55               | 4,476-81                 | 852-83                | 29-41                | 236-43                   | 5-25          |
| 5/E ...  | 39                           | 29-81                        | 15,100½               | 387-19               | 4,261-44                 | 824-94                | 21-15                | 231-28                   | 5-46          |
| 5/S ...  | 29-65                        | 26-87                        | 14,182                | 478-31               | 4,036-76                 | 693-08                | 23-38                | 205-99                   | 4-89          |
| 5/O ...  | 27                           | 17-87                        | 10,978                | 406-59               | 4,163-36                 | 559-73                | 20-73                | 219-86                   | 5-10          |
| 5/B ...  | 47-06                        | 31-90                        | 14,842                | 315-88               | 3,255-24                 | 622-75                | 13-23                | 145-83                   | 4-20          |
| 5/F ...  | 19-18                        | 14-16                        | 7,352                 | 384-32               | 3,779-86                 | 337-58                | 17-65                | 167-17                   | 4-59          |
| 5/T ...  | 21-19                        | 14-42                        | 10,900½               | 514-42               | 4,221-95                 | 504-66                | 23-82                | 200-43                   | 4-63          |
| 5/U ...  | 18                           | 10-77                        | 16,884½               | 938-03               | 7,965-04                 | 781-24                | 43-40                | 368-51                   | 4-83          |
| 5/V ...  | 25-97                        | 21-84                        | 7,206                 | 277-47               | 3,162-45                 | 337-88                | 18-01                | 159-10                   | 4-69          |
| 5/Y ...  | 26-55                        | 20-06                        | 10,424½               | 390-95               | 5,593-22                 | 680-10                | 23-63                | 312-98                   | 6-05          |
| 5/Z ...  | 32-97                        | 28-61                        | 21,188½               | 642-66               | 6,646-22                 | 1,088-47              | 33-01                | 323-14                   | 5-14          |
| 5/AA ... | 18                           | 15                           | 4,712                 | 261-78               | 4,149-07                 | 280-68                | 15-59                | 227-15                   | 5-96          |
| 5/CC ... | 32-90                        | 28-06                        | 17,175½               | 522-05               | 3,347-53                 | 720-83                | 21-91                | 145-50                   | 4-20          |
| 5/DD ... | 21-55                        | 17-03                        | 8,239                 | 382-32               | 4,630-20                 | 445-15                | 20-46                | 243-18                   | 5-40          |
| 5/EE ... | 17                           | 9-97                         | 5,089½                | 299-38               | 4,280-78                 | 259-90                | 15-29                | 226-11                   | 5-11          |
| 5/GG ... | 17-84                        | 11-65                        | 5,699½                | 319-43               | 4,207-00                 | 260-90                | 14-02                | 205-62                   | 4-58          |
| 5/HH ... | 18                           | 12-03                        | 5,211                 | 289-50               | 3,457-23                 | 261-37                | 14-52                | 165-81                   | 5-02          |
| 5/II ... | 27-81                        | 21                           | 12,503                | 449-58               | 5,339-77                 | 615-26                | 22-12                | 255-47                   | 4-92          |
| 5/JJ ... | 28                           | 19-61                        | 15,666                | 559-50               | 4,879-70                 | 632-32                | 22-58                | 212-95                   | 4-04          |
| 5/KK ... | 23                           | 21-32                        | 13,070                | 568-26               | 4,550-01                 | 594-50                | 25-85                | 215-60                   | 4-55          |
| 5/LL ... | 22-97                        | 21-61                        | 9,904                 | 431-17               | 4,001-25                 | 499-32                | 21-74                | 183-99                   | 5-04          |
| Means    | 26-08                        | 20-54                        | 11,665-23             | 448-20               | 4,432-17                 | 569-27                | 21-87                | 218-65                   | 4-88          |



## RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.

Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending August 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|-------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                   | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                     | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 40                                    | (5) 64                  | (6) *                   | 104     |
| Williams, W. R. ....     | Frewville .....     | (7) 69                                    | (8) 88                  | (9) 121                 | 278     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 89                                   | (11) 89                 | (12) *                  | 178     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 80                                   | (14) 103                | (15) *                  | 183     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 50                                   | (17) *                  | (18) *                  | 50      |
| Pearman, E. D. ....      | Rosewater .....     | (19) 81                                   | (20) 77                 | (21) 76                 | 234     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                    | (23) *                  | (24) 74                 | 74      |
| Burton, C. J. C. ....    | Mallala .....       | (25) 92                                   | (26) 81                 | (27) 89                 | 262     |
| Heath, H. E. ....        | Mile End .....      | (28) 85                                   | (29) *                  | (30) 72                 | 157     |
| Heath, H. E. ....        | Mile End .....      | (31) 77                                   | (32) 54                 | (33) 80                 | 211     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 62                                   | (35) 82                 | (36) 88                 | 232     |
| Howard, T. W. ....       | Woodville .....     | (37) 96                                   | (38) 52                 | (39) 76                 | 224     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                    | (41) 88                 | (42) 75                 | 163     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 50                                   | (44) 94                 | (45) 88                 | 232     |
| Gameau, V. F. ....       | Woodville .....     | (46) 84                                   | (47) 74                 | (48) 39                 | 197     |
| Gameau, V. F. ....       | Woodville .....     | (49) 86                                   | (50) 42                 | (51) 76                 | 204     |
| Aird, J. R. & Son ....   | Kilkenny .....      | (52) 65                                   | (53) 79                 | (54) 92                 | 236     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                    | (56) 84                 | (57) *                  | 84      |
| Barrett, L. ....         | Angaston .....      | (58) 54                                   | (59) 61                 | (60) 72                 | 187     |
| Barrett, L. ....         | Angaston .....      | (61) *                                    | (62) 22                 | (63) 91                 | 113     |
| Barrett, L. ....         | Angaston .....      | (64) 63                                   | (65) 39                 | (66) 49                 | 151     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 58                                   | (68) 61                 | (69) 90                 | 209     |
| Wiese, W. ....           | Cabra .....         | (70) 101                                  | (71) 87                 | (72) 79                 | 267     |
| Wiese, W. ....           | Cabra .....         | (73) 89                                   | (74) 87                 | (75) 74                 | 250     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 85                                   | (77) 81                 | (78) 80                 | 246     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                    | (80) †                  | (81) 79                 | 79      |
| Riggs, N. ....           | Camden Park .....   | (82) 106                                  | (83) 91                 | (84) *                  | 197     |
| Riggs, N. ....           | Camden Park .....   | (85) 105                                  | (86) 76                 | (87) 83                 | 264     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 82                                   | (89) 96                 | (90) 102                | 280     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 55                                   | (92) 82                 | (93) 98                 | 235     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                    | (95) 66                 | (96) *                  | 66      |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 97                                   | (98) 76                 | (99) *                  | 173     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 94                                  | (101) 25                | (102) *                 | 119     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 71                                  | (104) *                 | (105) *                 | 71      |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 46                                  | (107) 53                | (108) 71                | 170     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 79                                  | (110) 107               | (111) *                 | 186     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 95                                  | (113) 76                | (114) *                 | 171     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 75                                  | (116) 74                | (117) 78                | 227     |
| Hill, W. ....            | Knoxville .....     | (118) 86                                  | (119) 81                | (120) 83                | 250     |
| Hill, W. ....            | Knoxville .....     | (121) 88                                  | (122) 80                | (123) 77                | 245     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 59                                  | (125) *                 | (126) 65                | 124     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                   | (128) 84                | (129) 78                | 162     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 21                                  | (131) 79                | (132) 90                | 190     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 66                                  | (134) 100               | (135) 97                | 263     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 101                                 | (137) 89                | (138) 75                | 265     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 93                                  | (140) 65                | (141) 50                | 208     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.             | Address.            | Score for Month ended August 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                  | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Compton, R. C. ....      | Woodeforde .....    | (142) 30                                 | (143) 90                | (144) 81                | 201     |
| Connor, D. C. ....       | Gawler .....        | (145) 38                                 | (146) 69                | (147) 43                | 150     |
| Robinson, A. E. ....     | Hectorville .....   | (148) 105                                | (149) 93                | (150) 88                | 286     |
| Vann, R. S. ....         | New Hindmarsh ..    | (151) 71                                 | (152) 52                | (153) 72                | 195     |
| McLean, J. G. ....       | Black Forest .....  | (154) 36                                 | (155) 24                | (156) 60                | 120     |
| Fidge, H. ....           | Clarence Park ..... | (157) 50                                 | (158) 51                | (159) *                 | 101     |
| Fidge, H. ....           | Clarence Park ..... | (160) 37                                 | (161) 47                | (162) 88                | 172     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (163) 99                                 | (164) 41                | (165) *                 | 140     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (166) 96                                 | (167) 38                | (168) 99                | 233     |
| Monkhouse, A. J. ....    | Woodside .....      | (169) 88                                 | (170) 80                | (171) *                 | 168     |
| Monkhouse, A. J. ....    | Woodside .....      | (172) *                                  | (173) *                 | (174) 69                | 69      |
| Monkhouse, A. J. ....    | Woodside .....      | (175) 64                                 | (176) *                 | (177) *                 | 64      |
| Monkhouse, A. J. ....    | Woodside .....      | (178) *                                  | (179) *                 | (180) 41                | 41      |
| Sage, H. R. ....         | Nuriootpa .....     | (181) 43                                 | (182) *                 | (183) 97                | 140     |
| Mitchell, W. J. ....     | Woodside .....      | (184) 86                                 | (185) *                 | (186) 104               | 190     |
| George, L. E. ....       | Redfern .....       | (187) 98                                 | (188) 102               | (189) 66                | 266     |
| George, L. E. ....       | Redfern .....       | (190) 93                                 | (191) 80                | (192) *                 | 173     |
| George, L. E. ....       | Redfern .....       | (193) 77                                 | (194) 94                | (195) 93                | 264     |
| George, L. E. ....       | Redfern .....       | (196) 76                                 | (197) 96                | (198) 104               | 276     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (199) 92                                 | (200) 87                | (201) *                 | 179     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (202) 68                                 | (203) 50                | (204) 53                | 171     |
| Gameau, V. F. ....       | Woodville .....     | (205) 76                                 | (206) 55                | (207) 64                | 195     |
| Totals .....             |                     | 4,398                                    | 4,138                   | 3,929                   | 12,465  |

*Section 3.—Black Orpingtons.*

| Competitors.             | Address.            | Score for Month ending August 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|-------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                   | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Aird, J. R., & Son ..... | Kilkenny .....      | (208) 76                                  | (209) 87                | (210) 75                | 238     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (211) 46                                  | (212) 88                | (213) *                 | 134     |
| Williams, W. R. ....     | Frewville .....     | (214) 69                                  | (215) 85                | (216) 82                | 236     |
| Williams, W. R. ....     | Frewville .....     | (217) †                                   | (218) *                 | (219) 53                | 53      |
| Gurr, A. and H. ....     | Scott's Creek ..... | (220) *                                   | (221) *                 | (222) *                 | —       |
| Andrewartha, A. ....     | Underdale .....     | (223) *                                   | (224) 96                | (225) 98                | 194     |
| McFarlane, A. S. ....    | Kilkenny .....      | (226) 101                                 | (227) 91                | (228) 82                | 274     |
| Connor, D. C. ....       | Gawler .....        | (229) *                                   | (230) 72                | (231) *                 | 72      |
| Gillick, W. J. ....      | New Hindmarsh ..    | (232) 62                                  | (233) *                 | (234) *                 | 62      |
| Osborn, E. L. ....       | Camden .....        | (235) 69                                  | (236) 76                | (237) 83                | 228     |
| Totals .....             |                     | 423                                       | 595                     | 473                     | 1,491   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.            | Score for Month ending August 31st, 1930. |                         |                         |         |
|--------------------|---------------------|-------------------------------------------|-------------------------|-------------------------|---------|
|                    |                     | Bird No. and Eggs Laid.                   | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Gameau, V. F. .... | Woodville .....     | (238) 57                                  | (239) 74                | (240) 28                | 159     |
| Fidge, H. ....     | Clarence Park ..... | (241) 80                                  | (242) 71                | (243) 44                | 195     |
| Totals .....       |                     | 137                                       | 145                     | 72                      | 354     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



# VEITCH EXPERIMENTAL FARM HARVEST REPORT, 1929.

[By R. C. SOOTT, Supervisor of Experimental Work, and L. SMITH, Manager.]

This farm is situated in the Northern Murray Mallee lands, and, in common with other farms in the district, has yielded very low returns, owing to the extremely dry conditions experienced.

For the benefit of those not familiar with the location, it may be stated that Veitch is portion of the Hundred of Allen, and lies about 16 miles South of Loxton.

The experimental farm comprises 3,800 acres, of which about 2,500 are cleared and available for cultivation. Approximately 600 acres are as yet uncleared, whilst the balance consists of such poor sandy soil, subject to drift, that it is not considered wise to remove the natural scrub.

The bulk of the land is of a sandy nature, varying from light sand to shallow loam, with coarse calcareous soils overlying hard limestone rock.

## THE SEASON.

This is the third extremely dry season in succession, and examination of the rainfall tables submitted below will indicate the conditions with which farmers have had to contend.

The fallows on which the 1929 crops were sown received practically no rain. From August, 1928, to April, 1929, only 2.56in. were recorded, whilst normally fallows benefit to the extent of rather more than 8in. during this period. Consequently they did not receive the usual amount of tillage and were not as well compacted as desired. In this district April and May are the best seeding months, but the former was practically rainless, whilst in the latter only 44 points were registered. Seeding, therefore, extended well into June. Notwithstanding these conditions the grain germinated satisfactorily, and with a favorable spring, normal yields were possible. However, the falls in succeeding months were below the average, and combined with frequent winds, allowed sand movement to repeatedly cut off the young growing plants. Except where the crops were protected by belts of timber they were completely destroyed. Whilst the lack of moisture affected the development of plants, there is little doubt that the greatest factor in causing a total failure in much of our Northern Murray Mallee land was this cutting action of moving sand. Where this action was prevented, light yields were harvested.

## Monthly Rainfall at Veitch.

| Month.          | Year. |       |       |       |       |       | Means.     |
|-----------------|-------|-------|-------|-------|-------|-------|------------|
|                 | 1924. | 1925. | 1926. | 1927. | 1928. | 1929. | 1909-1929. |
|                 | Ins.  | Ins.  | Ins.  | Ins.  | Ins.  | Ins.  | Ins.       |
| January .....   | 2.01  | 0.71  | 0.00  | 0.18  | 0.68  | 0.14  | 0.45       |
| February .....  | 0.89  | 0.47  | 0.09  | 0.32  | 2.75  | 0.42  | 1.03       |
| March .....     | 0.41  | 0.61  | 0.13  | 0.30  | 0.71  | 0.20  | 0.78       |
| April .....     | 0.25  | 0.25  | 2.00  | 0.00  | 0.70  | 0.04  | 0.39       |
| May .....       | 0.69  | 2.91  | 2.59  | 0.54  | 0.38  | 0.44  | 1.45       |
| June .....      | 1.43  | 0.64  | 1.04  | 0.57  | 1.02  | 0.40  | 1.31       |
| July .....      | 0.19  | 0.74  | 0.96  | 0.96  | 0.94  | 0.48  | 1.03       |
| August .....    | 0.99  | 0.32  | 1.52  | 1.13  | 0.23  | 0.42  | 1.25       |
| September ..... | 1.58  | 1.78  | 2.45  | 0.85  | 0.77  | 1.11  | 1.62       |
| October .....   | 1.47  | 0.00  | 0.45  | 0.27  | 0.72  | 0.06  | 0.91       |
| November .....  | 1.37  | 0.00  | 0.00  | 0.34  | 0.00  | 0.59  | 0.74       |
| December .....  | 1.17  | 0.05  | 0.31  | 0.48  | 0.04  | 3.02  | 0.87       |
| Totals.....     | 12.45 | 8.69  | 11.54 | 5.94  | 8.94  | 7.32  | 11.63      |



*Distribution of "Useful" Rainfall.*

|                                 | 1924. | 1925. | 1926. | 1927. | 1928. | 1929. | Means,<br>1909-1929. |
|---------------------------------|-------|-------|-------|-------|-------|-------|----------------------|
|                                 | Ins.  | Ins.  | Ins.  | Ins.  | Ins.  | Ins.  | Ins.                 |
| Seeding rains (April-May) . . . | 0.94  | 3.16  | 4.59  | 0.54  | 0.38  | 0.48  | 1.84                 |
| Winter rains (June-July) . . .  | 1.62  | 1.38  | 2.00  | 1.53  | 1.96  | 0.88  | 2.34                 |
| Spring rains (Aug.-Oct.) . . .  | 4.04  | 2.10  | 4.42  | 2.25  | 1.72  | 1.59  | 3.78                 |
| Early Summer rains (Nov.) . .   | 1.37  | 0.11  | 0.00  | 0.34  | 0.04  | 0.59  | 0.74                 |
| Total "Useful" . . .            | 7.97  | 6.75  | 11.01 | 4.66  | 4.10  | 3.54  | 8.70                 |

The total for the year is 7.32in., but approximately 3in. fell shortly after Christmas, and was of no benefit to crops. This is the third lowest total in our records, the other extremely dry seasons being 1927, 5.94in., and 1914, 6.24in.

The average annual registration is 11.83in., and, therefore, the fall for 1929 is 4½in. below the mean.

The rainfall received between the months of April and November is regarded as being of direct benefit to the wheat crop, and is shown in the table termed "Useful" Rainfall. The quantity falling on the 1929 crops is seen to be only slightly over 3½in. This is the lowest amount recorded, followed by 1914, in which 3.66in. were registered. It is obvious that such a small quantity spread over eight months can be of practically no benefit to crops.

How unfavorable the agricultural conditions have proved is indicated by the rainfall records for the past three seasons.

The total rainfall for the years 1927, 1928, and 1929 has been 5.94in., 8.94in., and 7.32in. respectively, and the "useful" fall 4.66in., 4.10in., and 3.54in.

**HAY CROPS.**

In all, 110 acres were sown for hay, but the crops did not make sufficient growth for binding, and were fed off. Including a total failure for this season, the mean hay yield for the 1910-1929 period is 0 tons 19cwts. 41lbs.

**OAT CROPS.**

The oat crops were a complete failure, and an area of 57 acres was fed off. The oat average for the past 14 seasons amounts to 12bush. 22lbs.

**BARLEY CROPS.**

The barley made fair growth considering the character of the season, but failed to form grain. Barley has been grown on this farm since 1915, and the mean yield is 13bush. 21lbs.

**WHEAT CROPS.**

An area of 554.25 acres was sown to wheat at the rate of 1bush. of seed and 84lbs. 45 grade superphosphate per acre. However, 230 acres sown in Field Nos. 3A, 4, 7, and 11 failed entirely, and were not harvested. Of the balance, much was not worth reaping, but the machines were run over any areas yielding grain. The best patches were those protected from the action of drift sand, and these yielded up to about 4bush. per acre. The average for the area harvested was approximately 1bush.

It was not possible to obtain yields of varieties, but the most hardy appeared to be Sultan and King's White. In all 302bush. 35lbs. of wheat were secured, or an average of 38lbs. from an area of 554.25 acres.



In the following table the wheat averages since 1909 are shown:—

*Wheat Returns—Veitch, 1909-29.*

| Year.      | Total<br>Rainfall | "Useful"<br>Rainfall. | Area.    | Total<br>Yield. | Yield<br>per Acre. |
|------------|-------------------|-----------------------|----------|-----------------|--------------------|
|            | Ins.              | Ins.                  | Acres.   | Bush. lbs.      | Bush. lbs.         |
| 1909 ....  | 14.41             | 13.04                 | 22.00    | 396 0           | 18 0               |
| 1910 ....  | 16.91             | 10.15                 | 197.50   | 2,156 0         | 10 55              |
| 1911 ....  | 13.36             | 7.28                  | 620.90   | 5,080 30        | 8 11               |
| 1912 ....  | 12.16             | 10.87                 | 569.00   | 5,544 18        | 9 45               |
| 1913 ....  | 14.95             | 8.27                  | 791.40   | 4,742 28        | 6 0                |
| 1914 ....  | 6.24              | 3.66                  | 951.00   | 325 30          | 0 21               |
| 1915 ....  | 9.83              | 8.79                  | 602.11   | 6,681 51        | 11 6               |
| 1916 ....  | 16.69             | 15.29                 | 407.74   | 7,102 20        | 17 25              |
| 1917 ....  | 16.60             | 11.56                 | 469.91   | 7,156 50        | 15 14              |
| 1918 ....  | 9.20              | 8.41                  | 287.89   | 1,905 28        | 6 37               |
| 1919 ....  | 13.24             | 5.16                  | 263.62   | 1,419 32        | 5 23               |
| 1920 ....  | 15.50             | 13.76                 | 287.52   | 6,384 55        | 22 12              |
| 1921 ....  | 12.36             | 8.24                  | 553.61   | 6,256 18        | 11 18              |
| 1922 ....  | 10.28             | 8.69                  | 427.84   | 4,219 34        | 9 52               |
| 1923 ....  | 13.33             | 11.75                 | 405.75   | 7,060 58        | 17 24              |
| 1924 ....  | 12.45             | 7.97                  | 582.79   | 7,596 47        | 13 2               |
| 1925 ....  | 8.59              | 6.75                  | 557.43   | 5,858 35        | 10 31              |
| 1926 ....  | 11.54             | 11.01                 | 352.37   | 5,130 30        | 14 34              |
| 1927 ....  | 5.94              | 4.66                  | 403.90   | 838 17          | 2 9                |
| 1928 ....  | 8.94              | 4.10                  | 474.64   | 1,513 29        | 3 12               |
| 1929 ....  | 7.32              | 3.54                  | 554.25   | 302 35          | 0 33               |
| Means .... | 11.83             | 8.70                  | 9,783.17 | 87,672 45       | 8 58               |

The lowest return in our records is that secured in 1914, when the "Useful" rainfall totalled only 3.66in. and the wheat yield 21lbs. The results for the past season are very similar, as the "Useful" rainfall amounts to 3.54in. and the wheat average 33lbs. per acre. The best wheat years recorded are 1920 and 1909, with yields of 22bush. 12lbs. and 18bush. respectively, whilst the mean return for the past 21 years is 8bush. 58lbs. per acre.

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## AGRICULTURAL EXPERIMENTS AT INMAN VALLEY.

[By R. C. SCOTT, Supervisor of Experimental Work, and A. L. WARREN, Field Officer.]

(Conducted on the property of Mr. A. M. FULLER.)

At the request of the Port Elliot Branch of the Agricultural Bureau, Pasture Experiments were commenced at Inman Valley in 1928. Since that date the residents of Inman Valley have re-formed a local Branch of the Bureau, and these plots are now conducted under the joint interest of both Branches.

Mr. A. M. Fuller agreed to carry out the experiments on his property, situated about 12 miles from Victor Harbor on the Yankalilla Road. The site selected comprises 15 acres of flat land lying on the north side of the River Inman. Prior to purchase by Mr. Fuller, this land had received very little manure, and at the commencement of the tests was in a comparatively low state of fertility.

The soil varies considerably. Adjoining the river it consists of coarse sandy material which dries out rapidly, whilst at the foot of the hills it is of a black heavy nature.

During the past two years, rainfall records have been kept, but as there is no official gauge at Inman Valley, mean figures for the district are not available. However, it is generally considered that the registrations for Myponga, some nine miles north, most nearly approach those secured at Inman Valley.

In the following table, the rainfall, month by month, for the years 1928 and 1929 is shown comparatively with the mean fall for Myponga for the past 36 years:—

|                 | INMAN VALLEY. |               | MYPONGA.                 |
|-----------------|---------------|---------------|--------------------------|
|                 | 1928.<br>Ins. | 1929.<br>Ins. | (Mean 36 years.)<br>Ins. |
| January .....   | 1.49          | 0.71          | 0.74                     |
| February .....  | 1.73          | 0.00          | 1.28                     |
| March.....      | 2.42          | 0.94          | 0.92                     |
| April.....      | 1.38          | 1.77          | 1.50                     |
| May .....       | 2.29          | 2.22          | 3.96                     |
| June .....      | 6.36          | 6.28          | 4.85                     |
| July .....      | 5.12          | 3.74          | 4.09                     |
| August .....    | 0.80          | 4.03          | 3.37                     |
| September ..... | 2.15          | 4.44          | 3.62                     |
| October .....   | 4.21          | 2.06          | 2.15                     |
| November .....  | 1.04          | 0.96          | 1.49                     |
| December .....  | 0.54          | 1.36          | 1.17                     |
| Total .....     | <u>29.54</u>  | <u>28.51</u>  | <u>29.14</u>             |

The total rainfall at Inman Valley for the two seasons was approximately equal to the average.

June and July of 1928 were exceptionally wet, almost 11½ in. being registered in these two months. On the other hand, the summer was extremely dry. From the first week in November till the end of February, 1929, only 132 points of rain fell. This long, dry period caused the death of many young plants which had not become sufficiently established to withstand such conditions.



During the past season, June, July, and August were wet and frosty with the result that plant growth was retarded. The rainfall in succeeding months was satisfactory, and good pasture was secured in Spring and early Summer.

# PLAN OF EXPERIMENT.

The experiments consist of tests with varieties, pure stands, and pasture mixtures. The latter are sown in fenced plots, and grazing records secured. The plots of pure stands were seeded this season and consist of two varieties of grass which promise well for the district, each being sown on an area of approximately three-quarters of an acre.

The pasture variety tests comprise a collection of grasses and clovers considered likely to prove of value, being seeded separately in plots about a seventh of an acre in area. All experiments have received an annual dressing of 2cwt. 45 grade Superphosphate per acre. This season Nitrogen Fertilisers Pty., Ltd., desired to test the influence of applications of Nitrogen to pasture land, and it was agreed that the experiment could be conducted on these plots. Accordingly, a strip across each field was dressed with 1cwt. of Sulphate of Ammonia per acre during the first two days of May, and on Plot 2 a further cwt. is to be applied in Spring.

The fertiliser was supplied by the above company. The area so treated has not been fenced off from the main plot, no attempt being made to measure the benefit by the stock-carrying capacity. In order to allow the effect to be clearly noted, quadrats have been placed on the respective plots, thus protecting the enclosed area from stock. The growth of fodder from each treatment can then be compared in addition to any general advantages that are apparent.

## PLOT 1.

This Plot is 4.45 acres in area. At the northern end the soil is of heavy black nature with lighter sandy land on the southern side. It was seeded early in May, 1928, with the following mixture:—

|                               | Lbs. Per Acre. |
|-------------------------------|----------------|
| Perennial Rye Grass . . . . . | 12             |
| Italian Rye Grass . . . . .   | 6              |
| White Clover . . . . .        | 4              |

Germination was satisfactory, but a dry spell toward the end of May destroyed plants in those patches where the land was not of fine tilth. These patches were re-seeded during the first week of June. Lucerne flea checked the clover, and as many plants failed to survive the long, dry summer, it was decided to seed again in 1929. The seed applied was:—

|                                           | Lbs. Per Acre. |
|-------------------------------------------|----------------|
| Poverty Bay Perennial Rye Grass . . . . . | 10             |
| Wimmera Rye Grass . . . . .               | 10             |
| White Clover . . . . .                    | $\frac{2}{1}$  |
| Alsike Clover . . . . .                   | 1              |

Seeding was done on April 23rd by means of a drill. This implement was utilised so as not to disturb the plants already present. A good germination resulted, but as was the case in the previous year, the clover suffered from lucerne flea attack.

A very satisfactory stand has now been obtained, which should provide increased grazing in future years. Record has been kept of the number of stock pastured and the amount of fodder produced is calculated according to the sheep-carrying capacity.

As sheep, cattle, and horses have been grazed it is necessary to reduce all animals to the equivalent of sheep. A horse has been regarded as consuming an amount of fodder equal to 10 sheep, and cattle and light horses an amount equal to eight sheep. On this basis the plot yielded pasture for 1.43 sheep per acre in 1928, and for 2.89 sheep in 1929. It is anticipated that these grazing results will be considerably increased in future years.



## PLOT 2.

This field is larger than the preceding plot, being 7.18 acres in area, and contains a rather higher percentage of sandy soil. The seed sown in 1928 was as follows:—

|                                   | Lbs. Per Acre. |
|-----------------------------------|----------------|
| Cocksfoot . . . . .               | 7              |
| Meadow Fescue . . . . .           | 6              |
| <i>Phalaris bulbosa</i> . . . . . | 2              |
| Timothy . . . . .                 | 2              |
| White Clover . . . . .            | 4              |
| Strawberry Clover . . . . .       | 1              |
| Perennial Red Clover . . . . .    | 1              |

With the exception of Meadow Fescue and Timothy, the seed germinated well. Here again lucerne flea and dry Summer weather affected development. In order to thicken up the stand, a further mixture was drilled in on April 24th, 1929, consisting of:—

|                             | Lbs. per Acre. |
|-----------------------------|----------------|
| Cocksfoot . . . . .         | 5              |
| Sheeps Burnet . . . . .     | 3              |
| Chicory . . . . .           | 1              |
| White Clover . . . . .      | 3              |
| Strawberry Clover . . . . . | 2              |

The weather conditions following this seeding proved favorable, and a considerable improvement in pasturage resulted. Amongst the grasses *Phalaris bulbosa* and Cocksfoot have done really well, and there is also a fair sprinkling of Sheeps Burnet. The clovers suffered as a result of the lucerne flea, but are present and promise increased growth this season. On the heavier land Strawberry Clover has become well established and is yielding good grazing. Observations on the plot indicate that close attention must be given to the sheep grazing of Cocksfoot planted on light land. It was noted that if left on too long they pull up a large percentage of plants, thus rapidly destroying the pasture. On the heavier and tighter soil the damage is not nearly so severe.

The grazing records show the carrying capacity of this plot to have been 1.11 and 2.14 sheep per acre for seasons 1928 and 1929 respectively.

The outstanding fodder has been *Phalaris bulbosa*, and in order to still further improve the pasture in this plot, 2lbs. of seed per acre of this grass was drilled in this year. Germination has been fairly good, and we now have a satisfactory pasture field.

## PLOT 3.

For the purpose of testing pure stands of the two grasses showing most promise for the Inman Valley district, a further area was seeded in 1930 with *Phalaris bulbosa* and Perennial Rye Grass. The whole field covers approximately 1½ acres, and is equally divided between the two varieties.

On the whole, the soil is a rich dark-colored river flat which, during the last two seasons, has carried a potato crop.

At the end of May the land was well cultivated and manured with 3cwts. 45 grade Superphosphate per acre. In addition, a portion received an application of 1cwt. Sulphate of Ammonia per acre.

On June 3rd half the plot was sown with Perennial Rye Grass at the rate of 30lbs. per acre, and the remaining half with *Phalaris bulbosa* at 8lbs. per acre. Both varieties have germinated well, and interesting results are anticipated.

## VARIETY PLOTS.

In all 20 pasture varieties are undergoing tests in plots about 1½ square chains in area. Every year they have received a dressing of 2cwts. 45 grade Superphosphate, and grazed as required.

*Perennial Rye Grass*.—Made good growth at first, but, being sown on light land adjoining the river, did not survive the dry Summer. This pasture has since been resown on heavier land.

*Wimmera Rye Grass*.—Has made satisfactory growth, and re-seeded itself fairly well.

*Cocksfoot*.—Thinned out by the dry Summer, but promises to be one of our best grasses.



*Meadow Fescue*.—Thin germination and has made poor growth. Plot abandoned.  
*Phalaris bulbosa*.—The outstanding pasture in this experiment. Rather a thin stand in the first year, but has thickened up wonderfully. Is eaten readily by stock, and remains fresh throughout the Summer.

*Timothy*.—Germinated fairly well, but died out in the Summer. Plot abandoned.

*Crested Dogstail*.—Made fair growth, but retarded by Summer conditions. Abandoned.

*Meadow Foxtail*.—Complete failure. Abandoned.

*Danthonia pilosa*.—Very little growth to be seen in the first season. In latter years has developed well and yielded good grazing.

*Sheeps Burnet*.—A good drought resistant fodder, showing promise.

*Chicory*.—Germinated well, and has made good growth in the Summer months. Eaten readily by stock.

*Sulla*.—Fair growth at first, but later died right out. Abandoned.

*Lucerne*.—Absolutely destroyed by lucerne flea.

*White Clover*.—So severely damaged by flea that plot had to be abandoned.

*Alsike Clover*.—Recovered from flea attack, and has made fairly good growth.

*Perennial Red Clover*.—Suffered little damage from flea, but died out rapidly.

*Bokhara Melilot*.—Made practically no growth, and is apparently of little value here.

*Subterranean Clover*.—Attacked by flea, but later made splendid growth, and now provides a good stand.

*Clustered Clover*.—A useful variety which has done well. Eaten readily by stock.

*Strawberry Clover*.—Planted on heavy wet land. Germinated well and spreading rapidly. Particularly relished by stock.

#### GENERAL REMARKS.

Having experienced two seasons with abnormal weather characteristics, it has taken some time to establish these pastures. It is anticipated that satisfactory yields will be secured in the future and information of value to the district obtained.

The evidence accumulated indicates that the establishing of clover pastures is very difficult, owing to the presence of lucerne flea. The best clover appears to be Subterranean, followed by Clustered, Strawberry, and Alsike.

Amongst the grasses, *Phalaris bulbosa* is outstanding, and the seeding of this pasture can be confidently recommended. Perennial Rye Grass, Wimmera Eye Grass, and Cocksfoot have also done well, whilst Sheeps Burnet and Chicory can be included amongst the fodders showing value in this district.

We are glad to have the opportunity of expressing our appreciation of the manner in which Mr. Fuller has co-operated with the Department in these experiments. He has maintained a very keen interest in the work, kept careful records, and undertaken all operations in a thoroughly efficient manner. To the local Agricultural Bureau also we express our thanks for organising annual visits of inspection to the plots.

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## TOMATO DISEASES IN SOUTH AUSTRALIA AND HOW TO CONTROL THEM

with special reference to Glasshouse Tomato Culture.

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[By GEOFFREY SAMUEL, M.Sc., Plant Pathologist, Waite Agricultural  
Research Institute, University of Adelaide.]

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### INTRODUCTION.

Both outdoor and glasshouse tomatoes are now grown extensively round Adelaide. There is only one serious disease of the outdoor crop, and that is the Australian Spotted Wilt disease, commonly called just "tomato wilt." This disease becomes epidemic in certain seasons and destroys tomato plants by the tens of thousands. In suburban gardens on the Adelaide plains it is present every year, and many home gardeners have given up trying to grow tomatoes because of the disease.

In recent years there has been a rapid increase in the number of glasshouse tomatoes grown, however, mainly because of the high prices obtained for early fruit on the Melbourne market. The mild winter climate on the Adelaide plains enables the plants to be grown in unheated glasshouses, and owing to the simple type of construction employed houses can be erected at a comparatively small capital cost. The result has been that quite a considerable number of tomatoes are produced by growers who have put up a few houses "as a sideline," and who combine tomato growing with other gardening. At the same time there is an increasing number of growers who are devoting practically the whole of their energy to tomato growing, and who raise anything from 4,000 to 40,000 or more plants every year under glass.

Owing to the different conditions and the more intensive cultivation under glass, more diseases have made their appearance in the glasshouses than are known in the outdoor crops. Diseases are very erratic in their appearance, and every good grower knows that he must be constantly on the watch and adopt the best methods throughout his work in order to keep them in check.

Many growers have expressed the wish that a bulletin should be available, describing what is known about the tomato diseases which occur in South Australia. An ability to recognise the different diseases and some knowledge of the life history and method of attack of the parasites which cause them is of great value in applying control measures most economically.

Since freedom from disease depends very largely on the employment of good methods in growing the plants, the introductory part of this bulletin deals with general matters which make for healthy growth of tomato plants and the avoidance of disease. The material in this part of the bulletin should be known by every tomato grower.\*

The second and third parts of the article are for reference purposes only, and are so arranged that a grower who has any disease should be able to identify the trouble for himself and to find out as much about the

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\* The details of construction of glasshouses and seedframes are beyond the scope of the present bulletin. A useful article to consult is that by A. J. Pinn, in the *Agricultural Gazette* of New South Wales, vol. 40, pp. 701-14, "Tomato Culture under Glass."



cause of it as will help him in controlling it. To assist in proper identification, the description of symptoms of each disease has been made as full as possible, and all photographic illustrations have been made from South Australian specimens, which should help to make recognition easy.

No apology is made for giving considerable detail in the discussion of many of the diseases, or for including descriptions and illustrations of the fungi causing them, although these parasites can only be seen under a microscope. The writer has met many tomato growers in the last few years, and has found them eager to know all these details. In fact all that is in this article can be considered as consisting of the answers to questions which have been asked by growers. It is hoped that now the information is compiled in this way it will be of assistance to many more growers and will help them in their efforts to produce tomatoes free from disease. To the many growers who have contributed specimens or assisted in other ways towards the obtaining of the details here set down, the writer extends his thanks.

It will be obvious, after reading this article, that there is still much to be discovered about the best way of controlling some of the most troublesome diseases, especially under the conditions obtaining in South Australian glasshouses. Since steam is not available in these houses, some of the most useful control methods developed in other countries, such as steam sterilisation of the soil, or raising the temperature of the houses above a certain point, are not available here. Whether these can be replaced to some extent by methods of soil treatment, or any other methods, can only be determined by experimental work carried on in the future.

### GROWING HEALTHY PLANTS.

Tomato plants, like all other living organisms, have "likes and dislikes." If they are grown under conditions they like they flourish, and do not seem to be easily susceptible to diseases. If, on the other hand, they are grown under conditions which are not quite right they seem to take diseases more readily. It is, therefore, well worth while taking the trouble to provide the best growing conditions for them, not only in order to avoid diseases, but also that the fruit may be of the best quality, and that there shall be plenty of it. Nothing is so disappointing as to spend months in growing the plants, and then to find that the crop is poor, or the fruit is poor, or that much of it is spoilt by disease.

Undoubtedly one of the main factors influencing good growth and good fruiting is the type of soil, but all the operations which must be gone through, such as choosing the seed, raising the seedlings, transplanting, watering, manuring, &c., also influence the result to some extent. Although this is not primarily a bulletin on general tomato culture it will be valuable from the point of view of avoidance of disease to discuss shortly each of these steps which is concerned in producing general healthy growth. *Nothing is so important in the control of diseases as to prevent them making their appearance if possible, so that disease control is very closely bound up with the best general methods of culture.* It is usually the man who does not grow his crop in the best way who suffers most from disease. It would be a good incentive to using the best methods and controlling diseases to the best advantage if every grower set himself some standard yield to aim at, say 150 half-cases per 100ft. of house.



### THE SOIL.

The type of soil is one of the most important factors influencing the production of good quality fruit. Tomatoes like a deep well-drained soil, preferably of a sandy-loam nature. The best fruit is produced from soils in which the water disappears almost as soon as it is put on, and which are firm to the tread a few hours after they have been soaked. Clayey soils which become puggy after watering are not nearly so good, and if the subsoil is at all close to the surface tomato plants will not grow well on them.

The distribution of tomato glasshouses on the Adelaide Plains illustrates the soil factor very well. Most of the glasshouses are on the banks of the River Torrens, from Paradise to Lockleys, or on the banks of rivers such as the little Para and Sturt. There are patches of good, well-drained soil away from the rivers, but the soil in the average suburban garden round Adelaide does not grow tomatoes to their best. Good fruit can be produced on these soils, however, if adequate attention is given to improving them in the proper direction.

For growing tomatoes commercially, therefore, a prospective grower would pay considerable attention to choosing a good piece of soil on which to start. If it is not well drained, or if the subsoil is less than about 9in. from the surface the land is scarcely worth considering from the standpoint of commercial glasshouse tomato growing. A good piece of advice is to begin by digging a hole, and the deeper it has to be dug before coming to the tighter subsoil layer the better are the tomatoes likely to be.

If for any reason a grower could not secure a piece of the best type of soil, but could obtain, for example, a piece of well-drained soil which was otherwise slightly on the heavy side for tomatoes, it would pay him to spend something on improving it by the incorporation of several loads of sand per glasshouse (and possibly some gypsum if at all clayey) before growing the crop.

Another factor, besides soil type, which should be taken into consideration in choosing a site for tomato glasshouse growing is the equability of the climate and absence of frosts. Generally the closer to the sea the more moderate is the climate, and thus the more favorable for the growth of tomatoes. There are positions along the foothills also where frosts are rare, but as a general rule the soil type is not so favorable in this situation as it is nearer the coast.

One other point should be mentioned while dealing with the influence of soil and climate, and that is that certain varieties of tomato seem to be closely adapted to growing under certain soil and climatic conditions, and do not succeed well when put under other conditions. The "potato-leaved" variety, Burwood Prize, for instance, apparently bears excellent crops in New South Wales, and occasionally in some Hills districts in South Australia, but rarely produces a satisfactory crop on the Adelaide plains. Similarly, the varieties Dwarf Champion, Dwarf Giant, and others do not appear to be suited to Adelaide soil and climate. They are very susceptible to spotted wilt, but even when they escape this disease they do not bear well. There is opportunity for considerable experimental work to discover the tomato varieties best suited to Adelaide conditions, but for the time being there appears to be no tomato so well adapted to these conditions as the widely grown Early Dwarf Red.



## PREPARATION OF THE SOIL.

The way in which the soil is prepared before planting will have a considerable influence on the growth of the plants during the year. After one crop is finished preparation for the next crop should begin as soon as possible. The old plants of the previous year should be cut off about six inches above the ground, the tops dragged outside to dry, and then burnt as soon as possible, and the fallen leaves raked up and burnt also. (Burning is an important aid in reducing the amount of disease about.)

The ground should then be flooded, and next day the roots pulled up by the six-inch pieces of stem left, and these also be taken out, dried, and burnt. If lime is to be added (see below) it is best done at this stage, and the house can then be dug over and left to dry out in the hot weather of February. It seems possible that the high summer temperatures on the Adelaide plains might even have some partial sterilising effect on the soil in the empty glasshouses, for cases frequently occur where a root disease has been bad one year and not the next, although no sterilisation or any other treatment has been given.

When planting time is approaching a very heavy flooding is given to the soil, a heavy dressing of bonedust (about a bag per 100ft. of 15ft. house) and a layer of from 2in. to 4in. of well-rotted stable manure applied, and the whole house dug as deeply as possible. This treatment being given in autumn before the soil is too cold, should help to hold the moisture and warmth as long as possible, so that seedlings put out with only a little superphosphate and a "pot watering" can establish themselves and grow for several weeks before a trench watering becomes necessary. Too early waterings of seedlings after planting out is to be avoided if possible, for it is at the coldest time of the year, and watering would tend to make the ground colder and check growth.

There is a difference of opinion among growers as to the advisability of using stable manure. Some consider that it brings diseases with it, whereas others consider it indispensable. It is probable that its value varies to some extent with the type of soil, but on the whole one would expect it to be beneficial. It should undoubtedly be well rotted, however. It would be best for any grower who is in doubt to use it on one end of a house for several seasons, and he would soon find out for himself whether it was of value on his soil.

The bonedust and stable manure can be considered as the "Base manure" which is put into the soil to form slowly available reserves on which the plants can draw continuously. When fruiting commences dressings of more quickly available and soluble manures such as superphosphate, sulphate of ammonia, and potash are given to supply the elements which are rapidly drained from the soil when heavy crops of fruit are being removed. Under the intense systems of tomato culture in heated houses in Europe the base manure used consists of lime, stable manure, bone meal, bone flour, hoof and horn, and sulphate of potash. It is not necessary to use all these ingredients under South Australian conditions, and most growers do not even use lime. If lime is used it would be preferable to apply it with the first digging, and the stable manure with the later digging. Liming once every two, three, or four years, according to whether the soil is heavier or lighter in texture, would probably be of benefit in most South Australian glasshouses. A fairly heavy dressing, say, from 3cwts. to 5cwts. per 100ft. of 15ft. house, is suggested. Provided that it is applied some two months before the house is planted fresh or quick lime can be used, and may have some beneficial sterilising effect.



## RAISING THE SEEDLINGS.

At present tomato seedlings are raised in all sorts of ways, favorable and unfavorable, and it is only the natural hardiness of the plant which allows many of them to survive the treatment they get in the early stages and still produce a respectable crop. In most cases where a very good crop is seen it is found that good methods were used in the raising of the seedlings.

There are one or two growers who go to the great trouble of raising their seedlings each in a separate small pot. The advantage of this method is that there is no check at planting out time, but almost as good a result with much less labor can be obtained by the tray method. A kerosine case can be cut parallel to the sides into three parts, and if extra wood is available for the centre part three handy trays can be made from each case. Such trays, 21in. by 15in. by 3½in., will hold 63 seedlings planted 2in. apart, and are very convenient for carrying the seedlings about when planting.

Most growers, however, plant directly in the soil in special seedframes situated in a warm position. Some use a part of one of their glasshouses for the raising of their seedlings, and then planting up this house last of all. This method is not to be recommended, however, for the soil does not get a long enough spell from tomatoes, and diseases may multiply and be carried to the other houses with the seedlings. The tray method is probably the best, but is more trouble than planting directly into the soil in seedframes.

Better seedlings would be raised if more attention were given to preparing the soil for the seedbeds a long time ahead. Almost as soon as one year's seedlings are planted out into the houses the preparation for next year's seedlings can begin. Soil and manure can be mixed, and a pit or a heap of the mixture made which is allowed to gradually rot down to a rich loam over a whole year. This provides ideal soil for the raising of strong seedlings the following year.

At sowing time, usually early in March, this soil can be sieved and a little superphosphate turned in with it, and the seed sown in well-levelled beds or trays. In the tray method a little short straw or grass (without seed) is placed over the holes in the bottoms of the boxes, and the trays are then filled with the loam and scraped level with a board, and can be stood in piles until all are ready for sowing.

Seed sowing may be done in two ways. Either the seed is sown very thinly, and seedlings which come up too close thinned out so that all are well spaced, or the seed is first sown moderately thickly in a few trays or in a small part of the bed, and the seedlings which come up later pricked out at the three-leaved stage, as described below. In either case a free-running sample of seed is of great advantage in getting evenness of seedlings, for clumps of seed stuck together make some seedlings crowded and others free. (See page 165, on saving next year's seed.) When evenly sown the seed is covered with a thin layer of the same loamy soil that was used for the trays, sieved through a moderately fine sieve such as can be made from a piece of wire mosquito gauze. A light sprinkling of dry manure over the surface can then be given, but it is not necessary, and it is better to use none at all than too much. Sand is best avoided for covering seeds. The trays are then placed in the seedframe and carefully levelled, and watered with a spray fine enough to prevent any washing of the soil.

The construction of seedframes need not be entered into here, though it may be said that the galvanized rafter is valuable for avoiding the nuisance of drip; and a suitable slope for the lids and a warm, sheltered position facing north will make one less dependent on the manure-bed beneath for a suitable temperature for the growth of the seedlings. Raising the lids



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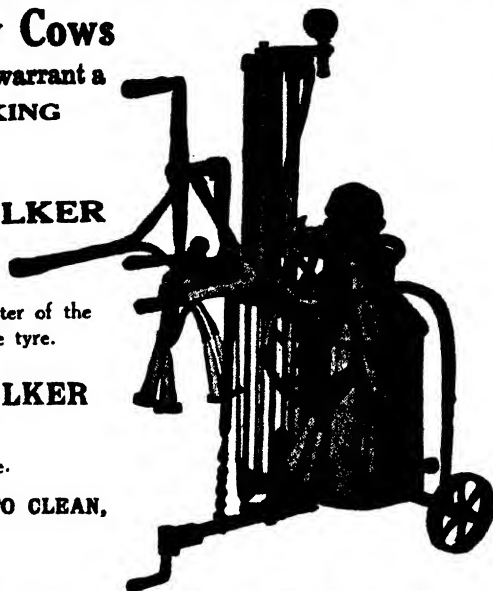
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with a brick if the frames get too warm, and lowering them immediately it becomes cool, are also well worth taking the necessary trouble over. The best temperature for the growth of the seedlings is between 60° and 70° F.

When the seed has come up, and the third leaf of the young seedlings is about half an inch long, is the time to prick them out singly at even distances apart in the seedframes or in fresh trays. From 2in. to 3in. apart is the most suitable distance for forming good sturdy seedlings which can be lifted with a square block of soil round their roots when it comes to planting out.

Considerable time can be saved and a much neater result obtained in pricking out if a press board is made studded on the under side at regular intervals (say, every 2in. or 2½in.) with wooden projecting pegs about the size of one's little finger. When the soil in the beds or trays has been prepared the press board is pressed down and, say, 50 to 100 holes for pricking out made all at once. The actual pricking out of the young seedlings should be done by a very careful worker. The young seedlings should be lifted only by their leaves, and not be handled by the stems. They can be quickly separated and dropped into the evenly spaced holes ready for them, and then the pressing and firming done with a suitably shaped wooden dibble. It makes for better seedlings if they are planted deeply—almost as deep as the two seedling leaves.

If a little superphosphate has been placed in the soil, and the seedlings are kept well watered, and the temperature is regulated by proper attention to the raising and lowering of the lids of the frames, the plants quickly establish themselves and become strong and even in appearance. Just about when they begin to touch one another the process of hardening off should begin, the lids being taken right off the frames for part of the time. At first it should be for only a few hours on a sunny day, but the time can soon be lengthened to a whole day, and if there is no danger of frost the lids can be left slightly blocked up all night. After about 10 days of this treatment the seedlings should be very sturdy, and ready for planting out. There should be a good spread of leaves on each seedling, and strong, thick stems, slightly purple in color at the base, paling gradually to green at the top.

If stems or leaves are very purple it indicates that the conditions are too cold (or occasionally that disease is present). If the tray method is being used, cold conditions can be remedied by building a fresh bed of manure under the boxes, but when the seedlings are planted in the soil this method cannot be used. Large growers may later find it advantageous to have some form of controllable artificial heat for the raising of seedlings in seasons when the weather is not the best.

During the whole time of raising the seedlings to this stage they should be inspected periodically, and any diseased ones removed immediately. The main disease which may affect plants at this stage is the Damping-off disease, which attacks the stems just at ground level and causes the young plants to flop over. This will be described in further detail later. It is advisable also to remove at this stage any strangers which may have accidentally got in, and also any obviously weak or backward seedlings. It gives the ones which are left all the better opportunity of developing as strongly as possible, and makes for evenness in the plants for the houses.

#### PLANTING OUT.

When good seedlings have been raised according to the above methods it becomes worth while to give them the best of treatment in planting out. The two important points in planting out are (1) to give the seedlings as



little direct handling as possible and (2) to supply them with the best conditions for commencing active growth immediately.

With regard to (1) the tray method is almost ideal, for the boxes of 60 seedlings can be taken and set along the house, and the seedlings are not disturbed until actually planted. When planting, each seedling can be removed from the box with a sharp trowel with a square of soil surrounding its roots; it is lifted by this square of soil, and the actual seedling need never be touched. Once again, it is better to plant slightly on the deep side. Practically the same methods can be used where the seedlings are grown in the soil of the seed-frames, but the transportation after they have been cut out often tends to shake soil from their roots and they do not get quite such a good start as seedlings which are planted with a lump of the original seedbed soil still undisturbed round their roots.

With regard to (2)—supplying them with the best conditions for commencing active growth immediately—good previous preparation of the soil and the presence of a little superphosphate are the main requisites. The bonedust and manure of the basal dressing is not quite sufficient for best growth, and a little superphosphate should be added when each seedling is planted; it helps the plants to establish themselves as quickly as possible. The plants can also be helped by the choice of a cool, cloudy day for transplanting, and by keeping up the watering fairly close behind the planters.

#### EARLY CARE AND PRUNING.

If the soil has been well prepared the young plants will not need watering for the first month or six weeks, or even two months, after planting out. This helps the plants to quicker growth in the early stages, for the soil is not cooled down by watering at what is practically the coldest time of the year. During this time the wires and strings are adjusted, pruning commenced, and the soil hoed up into the beginnings of the banks. There is no need to bank up too early. Many growers remove a number of the bottom leaves in order to get the banks up quickly, but the plants will probably establish themselves quicker if the bottom leaves are left on as long as possible.

The operation of pruning gives another valuable opportunity for passing every plant in review and removing any which are diseased or even not up standard. It is in these early stages that the foundations for the future even and healthy growth of the whole house are laid. The man who thinks when he comes to a poor plant, "Oh, I'll leave that in and see if I can doctor it up a bit," is the man who will never get a house full of good, even, healthy plants, and who may get instead disease gradually spreading and appearing here and there all over his houses. The secret of success is, "Out with the backward plant as soon as possible, and fill its place with a sturdy plant," preferably one from a stock of replants at the end of a special house, planted out at the same time as the main batch. In every population of thousands there must occur some poor specimens, and so a supply of good replants should be provided as a matter of course.

This removal of diseased and backward plants can be done in a good way and a bad way, however. The bad way is to do it while the pruning is going on, and then go on pruning the next healthy plant. There is danger in that method. The good way is not to touch the backward plant, but to put a light stake in beside it, and then come along at the end of the day and remove carefully all the marked plants with the soil around their roots, and cart them away and bury them. A pit for burying diseased plants, or an incinerator, should be just as necessary an item as a roof to the glass-



house, and yet on how few properties is it found? After burying or burning all the poor plants the hands should be washed with soap, and healthy replants planted immediately into the gaps with a little superphosphate, and watered in with Cheshunt mixture. This routine of pulling out and replanting only at the end of the day's work is not complicated, and really saves time in the end. It is one of the best safeguards against spreading diseases.

Good growers will make this careful "inspection" a routine, which is carried out at least twice a week. The sooner a diseased plant is out the better. When the eye becomes practised diseased plants are very quickly seen, especially in the morning. A thousand plants can be inspected by slowly walking up one side of a glasshouse and down the other in less than five minutes. This means that a grower with 10,000 plants could inspect them all in about an hour. He can carry a small bundle of stakes with him and mark those to be removed, and the removal and replanting should be left till the end of the day as described above. The reward will be houses of even growth and every plant bearing its quota of fruit.

The best way of pruning is pulling the young side-shoots out with the finger and thumb as soon as they are about  $\frac{1}{2}$  in. long and big enough to catch hold of. If other work has delayed pruning, it may be advisable to carry a pruning knife for the bigger shoots. In all cases it would be a wise plan to wash the hands and the knife with soap and water after finishing each house. Remember not to touch a backward plant as soon as it is come to, but stick a light stake in beside it. If virus diseases are present in the house it may be advisable not to prune more frequently than once a fortnight, as explained in the section on Mosaic Disease.

When the plants are above the top wire they are "topped" just above a strong side shoot, and the temporary check which is given assists in swelling the third and fourth trusses of fruit.

Finally, a word should be said about watering and hoeing. Good growth of the plants depends very largely on good growth of the roots. Good growth of the roots depends on air in the soil as well as water. That is why plants on open-textured soils grow better than those on tight soils. Proper watering must be regulated according to the texture of the soil, and is an art which can only be acquired by practice. After every watering the surface should be cultivated either with the pronged hoe or with a weighted hand tyne cultivator. The latter is an excellent tool for free-working soils and saves a great amount of time. Hoeing or cultivating pays for itself by promoting vigorous growth. Lastly, weeds should be kept down round the glasshouses. Have everything outside as clean and neat as inside and another link will be added in the chain of methods of disease control.

#### MANURING.

The "base manure," which is worked into the soil at the time of preparation of the house for planting, has already been described on page 157. This, with the little superphosphate given to each seedling at planting time, is sufficient to carry the plants on until the first truss of fruit is swelling.

From that time onwards manures are supplied with the object of "swelling the fruit." This really means just supplying the soil with the right amount of plant food to enable the fruit to develop to its maximum. The fruit which is harvested is continually draining from the soil its



supply of phosphate, nitrogen, and potash, and if fresh supplies of these three chemical substances are not added the fruit on the upper trusses cannot develop to the full extent.

Phosphate is best supplied as 45 per cent. water-soluble superphosphate; nitrogen is best supplied as sulphate of ammonia, which is a quickly available form, together with blood, which is more slowly available; potash is best supplied as sulphate of potash. The following proportions give a mixture which has been found very satisfactory:—

- 2 parts superphosphate 45 per cent.
- 1 part sulphate of ammonia.
- 1 part blood manure (or M.A.B.).
- 1 part sulphate of potash.

The same manure can be used without the blood if desired.

The ingredients should be measured out with a tin or by the shovelful and placed together in a heap on a cement floor and turned over with the shovel until thoroughly mixed. The mixture is then used at the rate of about 50lbs. per 100ft. of house just before waterings. About four or five applications during the season are usually sufficient. It is best if the manure is scratched into the soil along the trenches with a pronged hoe before watering, so that it is not all carried along with the stream of water. This is where the man who has chosen the best soil reaps some advantage, for clayey soils set hard when watering becomes frequent, and the hoeing in of manure becomes quite a work.

The time of application of each lot of manure, which falls roughly at periods between a fortnight and three weeks, should be regulated to some extent according to the pickings of the fruit. If the precautions detailed on page 161 on removal of backward plants have been consistently observed from the start, the plants in the houses should be very even, and picking of the successive trusses should occur very regularly. Under these conditions it is best if each fresh application of manure is given about the time the picking from one truss is coming to an end and the fruit on the truss next above is commencing to swell.

A word may be said here about the value of potash for tomatoes. South Australian soils are fairly well supplied with potash, and most plants do not need any more than is normally available in the soil. But the tomato requires a lot of potash, and responds well to extra dressings, not so much in size or amount of fruit as in quality and firmness. Dressings of nitrogenous manures such as sulphate of ammonia swell the fruit well, but if potash is not supplied in addition the fruit is apt to become too soft and watery. Research work in England has shown that the potash requirement of tomato plants varies with the amount of sunshine received, less potash being required during bright sunny weather than under dull conditions. The function of potash may therefore be considered to be the giving of the necessary "firmness" to plants which in other respects are being forced, and which would become too soft and sappy without it. Potash is also of value in minimising losses from streak disease, if this is present.

The question is frequently asked, "Is it better to use nitrate of soda or sulphate of ammonia as a nitrogenous manure?" The question involves problems in soil chemistry as well as in plant growth. Both materials are good sources of nitrogen, but it may be stated here that the experience of growers in England is in favor of sulphate of ammonia in preference to nitrate of soda for tomato growing.



## OTHER FACTORS AFFECTING FRUIT PRODUCTION.

*Excessive Cold.*—In the unheated type of glasshouse in common use in South Australia it is not at all uncommon for at least one truss of fruit to be lost as a result of a frost coming just at the time pollination should be taking place. It is always one of the lower trusses which is lost in this way, and therefore the highest priced fruit. At present nothing seems to be done to check the trouble. It is very probable that in the future, frost-alarm thermometers may be fitted in the glasshouses which will call the grower from his bed if the temperature drops below a certain point, and some smoke or other device used to check the harmful effect of the cold.

*Pollination.*—No special attention is given to pollination by the majority of growers in South Australia, but in some countries elaborate pains are taken to ensure good pollination. The more laborious of these, such as going along with a watch-glass of pollen and dipping the stigma of every flower into it, are not worth consideration for South Australian conditions, where pollination seems to occur so well by itself. The method adopted in Canada, however, where glasshouse growers go along with a rabbit's foot tied to the end of a long stick and just lightly touch the open flowers might be found to be of benefit under our conditions, especially in helping the setting of the early trusses. Another method is to go along and tap the wires every day to give the plants a little shake and aid pollination in this way, but this would not be so effective as the rabbit's foot.

It is not generally realised that the more thorough the pollination the better the development of the fruit, and that the explanation of a lot of the small fruit at times when ample manure seems to have been provided is probably defective pollination. If there were no pollination no fruit would develop at all.

*Excessive Heat.*—Just as the glasshouses get too cold in winter they also get too hot in summer. The usual type of glasshouse round Adelaide is not provided with any means of controlling the ventilation other than by opening the doors at the ends and removing panes along the sides. It is probable that better control of ventilation, especially ridge-pole ventilation, will soon be incorporated in any new glasshouses which are built. The optimum temperature for the growth of the tomato plant in the younger stages has been worked out in England to about 65° F., and while the plants probably need somewhat higher temperatures by the time they come to fruiting it is probable that temperatures over 80° are above the optimum. In the not far distant future every good grower will have a thermometer in his houses, and regulate the ventilation according to the reading of the thermometer.

As the houses are constructed at present, a light spraying of whitewash over the roof, put on some time in December, should help to keep the temperature down and prevent sunburn. A wash containing lime should not be used, however, because it gradually etches the glass. Plain flour, with a very little boiled flour paste added as a sticker, would be the best spray, and it should be washed off as soon as the season is over.

*Diseases.*—Another factor influencing fruit production is the presence of diseases. These are dealt with in detail later, but one or two of the less obvious ones may be mentioned here:—

*Eel-worm*, which causes clubby roots, often does not show any very definite symptoms on the tops of the plants, and the first sign of its presence may be only a failure of the fruit to set, or, at other times, a general falling-off in vigor and in the swelling of the fruit. If these symptoms are noticed, a plant should be pulled up and its roots examined, when the presence of irregular swellings on the roots will immediately betray the presence of eel-worms.



*Mosaic* disease, which causes a faint mottling and curling of the leaves, often reduces fruit production also. It will be more fully discussed later.

*Root* diseases are often rather difficult to detect in the early stages, but the practised eye can note at a glance the slightly thin looking top, the tendency for the lower leaves to yellow slightly, and other signs. These will be dealt with in a subsequent issue.

#### SAVING NEXT YEAR'S SEED.

One of the biggest causes of the spread of disease is probably the buying of seedlings. Any grower in a big enough way to need a thousand or more seedlings should never think of buying them, but raise them himself according to the methods outlined above. Seed rarely carries any disease, whereas seedlings frequently do so.

Not only should the seedlings be raised by the grower, but also the seed itself should be saved by the grower. If he follows good methods he will be certain that he has good seedlings and of a good type. There is no truth in the idea that a periodical change of seed is necessary; in fact, the reverse is the case. By careful selection of his seed plants a grower can build up a better and more uniform type of plant than he started with, and gradually improve it from year to year. Whereas if he goes and buys a big batch of fresh seed, of which he does not know the history, he may get non-uniform plants again, from which he will have to begin the process of selection over again.

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In saving one's own seed the most important part of the process is the choosing of the seed plants. This should be done by choosing plants which show a combination of as many desirable characters as possible. Not only size of fruit, but shape, earliness, and other characters, type of fruit-truss, number of trusses, and evenness of distribution up the stem should all be taken into account. For this purpose it is necessary to do the choosing of the seed plants just before the first fruit is picked, otherwise some of the evidence has already gone. Also, the aim should be to save the whole of the seed from the chosen plants—not to sell the fruit of lower trusses and keep only the later fruit for seed; this would be false economy.

To secure the most even type of fruit, a single plant—the best that can be found—should be chosen, and the seed from this kept separate and planted in a block in one of the best houses. The seedplants for the bulk of the following season could then all be chosen from this block, while again the very best plant is selected for separate seed-saving as before. This practice of saving seed from single plants makes for uniformity of plants and maintenance of the best and most even type.

Since the fruit picker goes along the rows with his back bent and his eyes only on the bottom trusses of fruit, it is no good ticketing seedplants on the top wire. Their fruit would be picked with all the rest and go to market "as sure as eggs." The best way to mark the chosen seedplants is to have a long strip of white calico and tie it on the top wire and wind it down round the plant so that it passes every fruit truss and acts as a warning—not to pick!

Let the fruit get thoroughly ripe on the plant, and then bring it in for extracting the seed. This is best done by cutting the fruit in half and scraping out the seeds in their pulp into a tin and adding about an equal quantity of water. Let stand for a few days, when a light white scum due to fermentation will be seen to form on the top of the liquid. Stir occasionally and pour off the top liquid once or twice. The best seed sinks to the bottom and becomes bright and clean. There is no danger in its being under water for a week. The fermentation has dissolved away the mucilaginous coating round the seeds, and they can now be washed clean by several rinsings or by pouring into a gravy strainer and running a stream of water through the strainer for a while. The seed is then spread out on canvas (blotting paper or newspaper will do) and allowed to dry. When cleaned by this method the seeds do not stick into clumps as they do when extracted straight from the fruit. The free single seeds are much better for sowing, and form better young seedlings for pricking out.

Seed obtained from the best healthy plants in this way does not need disinfection before planting. It grows better without treatment. If new seed is bought, however (perhaps to obtain a new variety), from some source where the seedplants have not been seen, it is advisable to disinfect it. Several cases have come under notice in which diseases have appeared in houses following the introduction of some outside seed. The best way to disinfect seed is to buy some 1:1000 corrosive sublimate solution (mercuric chloride) at the chemist; then soak the seed in this solution for 10 minutes, wash several times in water, and spread out to dry. Remember that corrosive sublimate is very poisonous.

*(To be continued.)*



## DRESSMAKING AND FANCY STITCHERY.

[By Miss ELLIE CAMPBELL, Inspector of Domestic Arts, Education Department.]

Spring is here, so thoughts turn to frocks and clothing. The wardrobes are turned out, and the contents looked over for renovations or replacements. In the planning and scheme of work, perhaps the following hints might be of some help to the woman who is distant from the costumiere or dressmaker, and has to depend on her own efforts. Unfortunately, all phases of home dressmaking could not be dealt with in one article, for it would become a volume, so just a few important points are selected.

Nowadays the designers and the commercial pattern companies have done much to assist in simplifying dressmaking for the housewife; thus with a little care and effort the clothing account can be considerably reduced. Several firms prepare and publish patterns for styles illustrated in their fashion books. There are two ways of procuring a commercial pattern; the most common way is to carefully look through a fashion book, and select the style of frock that is most becoming, then the pattern is ordered according to the bust measurement for a blouse, jumper, or frock, or to the hip measurement for a skirt. These patterns are drafted in proportion to the measurements of an average figure. The second way to procure a pattern is to send the measurements of the person to the firm, and indicate the style of garment that is required; they then draft the pattern—this is a surer way of obtaining a good fit.

A garment must fit the body well for the person to feel comfortable and at ease in it. If it fits well it will grace the line of the body, and will have a distinctive look. To send the measurements to the designers, it is well to know just where and how to take the measures, also they are very handy in order to check the size of a "commercial" pattern. The person should stand naturally, and the arms should not be raised nor the head lowered whilst the measures are being taken. The diagrams following will show where to take the various measures.

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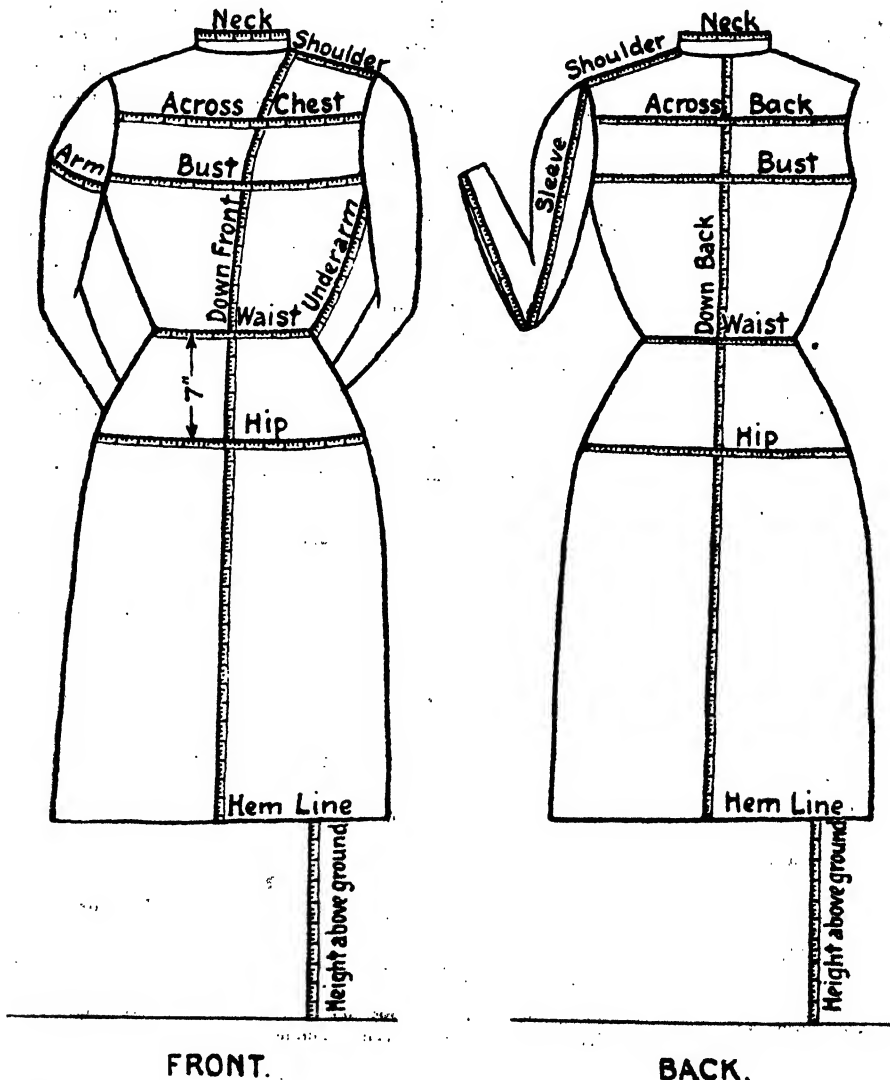
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The neck measure should be taken comfortably, not too loosely nor too firmly.

The shoulder measurement is taken from where the neck joins the shoulder to the top of the arm joint.

The cross chest should be taken firmly across the chest, above the bust line, just where the arms join the body. The bust measurement is taken right around the body under the arms, passing over the shoulderblades and across the fullest part of the bust. It should be a loose measurement, to allow for expansion of the chest and for free movement. The waist measurement should be firmly taken around the body a little below the ribs. This is not always the waist line of the frocks—that is obtained when designing the gown.



FRONT.

BACK.

The underarm is taken down the side from the armpit to the waist line.

The cross back is taken above the bust measurement, where the arms join the body.

The hip measurement is taken loosely, 7 in. below the waist. This measurement has to allow for the spring of the legs and body.



The down front measurement is taken from the point where the neck joins the shoulder, over the bust, down centre front to the ground. The height of the edge of hem above the ground is to be deducted to give the correct down front length of frock. The down back is taken from the bone at the nape of neck to the ground, and the height of hem above ground deducted as for front measurement.

The sleeve measurement is taken with the arm bent, the hand resting on the chest. Measure from top of shoulder joint, around point of elbow to the wrist bone. This allows for the bend of the arm.

Wrist, measure around the broadest part of the hand, keeping the thumb in the palm of hand.

It is most important that these measurements be taken very accurately, as the whole fit of garment will depend on them, also the amount of material to be used will be governed by the pattern. With these measurements the commercial patterns can be tested and adjusted.

In order that the pattern may be pieced together properly, various methods have been devised to indicate the pieces to be joined; it is necessary to understand and read the patterns. One method is the use of lines, arrows, and wording. The broad dark line is the cutting line; the fine broken line is the seam line; the double arrow indicates the way of the grain of the material—that is the way of the threads, not the pattern of the material; thus it can be a crossway grain or a lengthwise grain, the way of the selvedge, the darkened notches are numbered and they correspond. Another method is the use of perforations. Large punctures in pairs, in a line, are used to indicate the way of the grain, smaller punctures marking the seam line; yet smaller punctures to indicate tucks, gathers, or pleats. The edge of the paper pattern is the cutting line. Folds are indicated by three punctures forming a triangle. It is most essential that the pattern should be placed on the grain of material correctly, as this affects the hang of the garment.

Having read and tested the pattern, some slight alteration might be necessary to give good fit. Following are a few suggestions for keeping the line and design, although altering the measurements:—

1. To lengthen pattern 3ins. or 4ins.—Cut across the front pattern 2ins. above waistline, and spread pattern 1½ins. or 2ins. Cut across the front pattern below hip-line and let in the necessary 1½ins. or 2ins. This will give the extra length.

Cut the back pattern to correspond.

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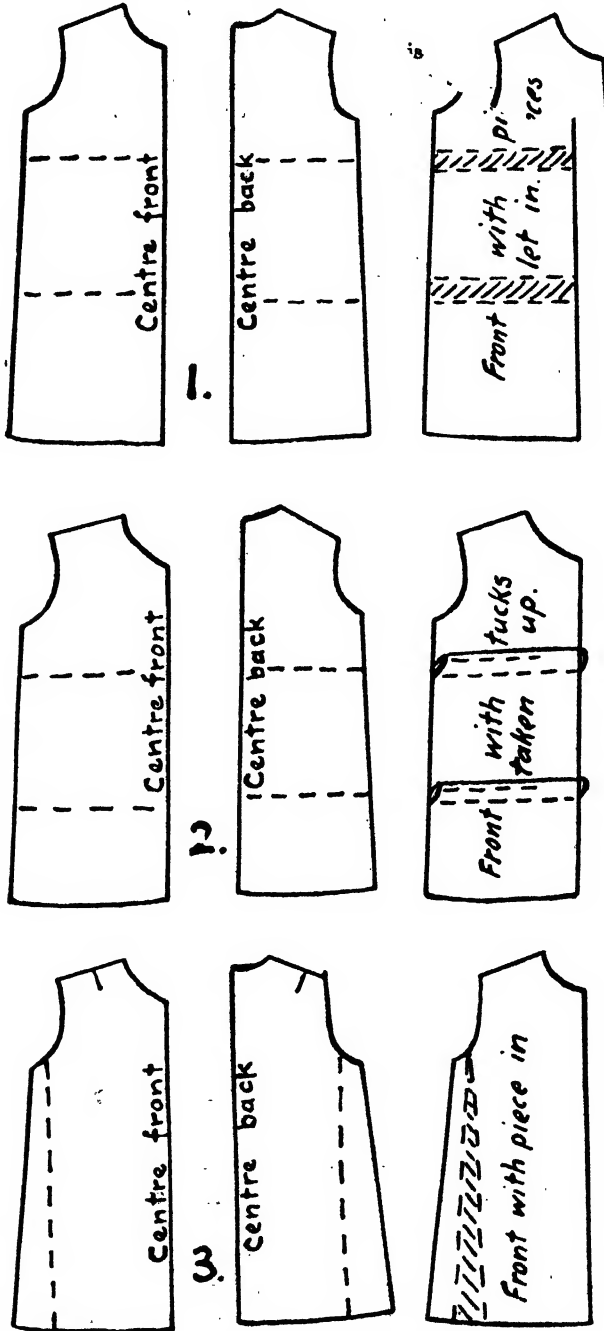
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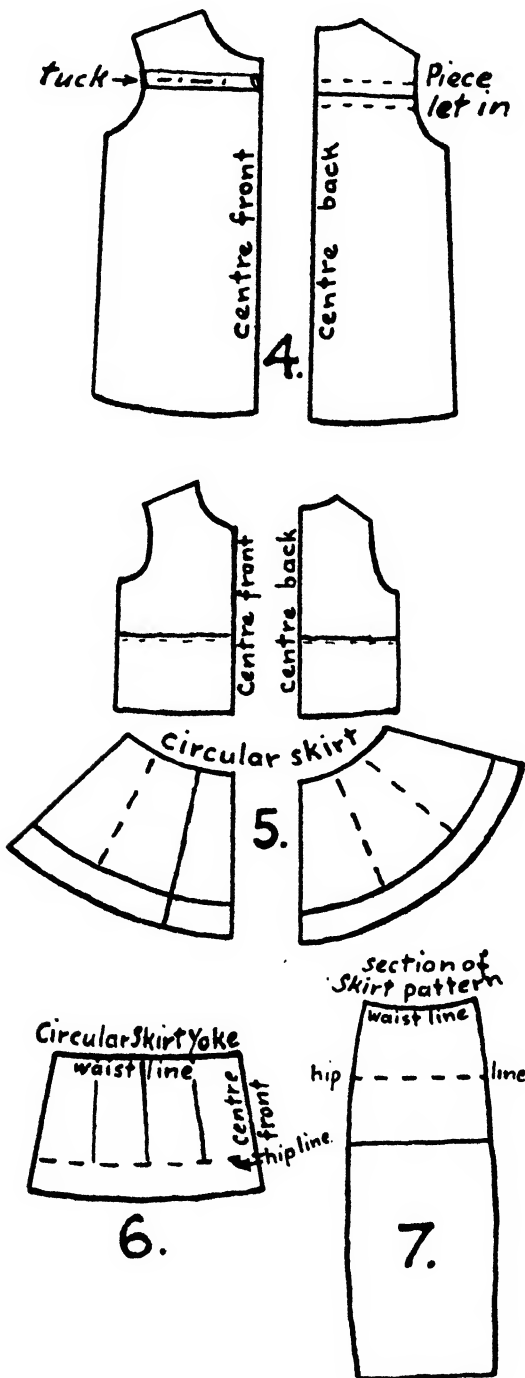


2. To shorten pattern 4ins., place an inch tuck across the pattern between the waist and bust lines, also another inch tuck below the hipline.



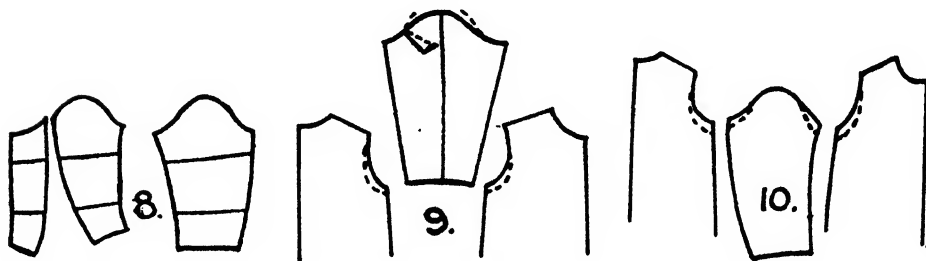
3. To widen a pattern that is tight at the hips, cut pattern from a point 2ins. in from corner of armhole down to hemline, and spread the necessary amount; fasten to new paper. This will give extra width for hips and spring of legs when walking.







4. To alter pattern to suit a round back and flat chest—Cut pattern along line of cross back measurement and spread it the necessary amount. Put a tuck in the front on cross chestline, taking up the same amount as was let into back. Add same amount to lower edge of front to adjust the hemline.
5. To shorten a pattern with a circular skirt—Place small tuck in bodice, between waist and bust lines. Cut skirt pattern in more than one place, being careful to have even distance top and hem. Spread to allow the new hemline to have same measurement, and cut off extra length, being sure to keep the circular cut.
6. To make a circular yoke pattern larger at the hips—Cut the pattern in three places, from the waistline to the hipline, and spread the necessary amount.  
To shorten the waistline of circular yoke—Place three tucks in yoke, at equal distances, taking up the extra length between them; taper the tucks from waist to hipline.
7. To adjust length of skirt pattern, that has two or more pieces—Make tucks, or let in extra length, 6ins. below hipline.



8. To lengthen or shorten sleeve pattern, make the adjustments above and below the elbowline, by either letting in the extra length, or taking up the extra amount in tucks.
9. To make a fuller sleeve, cut from top of curve to middle of cuff, and spread pattern to arm measurement, adjust curve by equal amount that is taken up in pleats in pattern. Adjust armholes equal amount.
10. To make deeper armhole, an equal amount must be cut from back and front of bodice pattern, also both sides of sleeve curve. Be careful to deepen both sides.

When the pattern is adjusted to the required measurements, it is advisable to place the whole pattern on the material, before starting to cut out. Often an appreciable amount of material can be saved with careful placing; take time to think it out, then thoroughly look over the placement. Do not be in too great a hurry to cut, as a wrong cut often wastes material. To prove the pattern, before cutting out in expensive cloth, make the garment up for a housefrock in a cheap material, such as zephyr or cambric. This will often give confidence and assurance that the better garment will give satisfaction.

Careful and neat finishings are advisable, as the seams and hems are strengthened. There are two kinds of seams: the French or double seam, and a flat seam. In this seam it is necessary to neaten the edges of the material to prevent fraying; this can be done by either overcasting the edge, and keeping it flat, turning the raw edge in and machining down, or by nicking along the edge of material (this is known as pinking the edge).

The neck, and sometimes the hem, can be bound by a bias bind—here the bind must be on the true cross, or bias, for it to sit correctly. Necks and cuffs can be faced and piped; the facing should be cut similar to the part to be faced. Hems can be slip-stitched, or if light material, hemstitched. Buttonholes can be worked or bound, and they should be carefully finished off.



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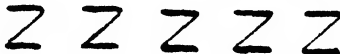










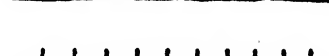
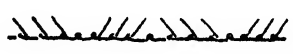
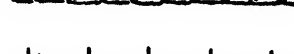
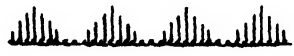
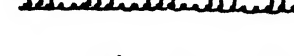
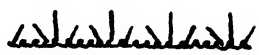
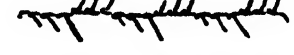
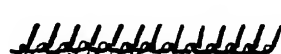



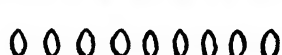


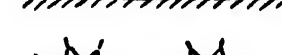






The finishing leads to longer wear and service of the garment. The appearance of the garment, especially in children's clothes, is often improved by a little simple stitchery around the collar, cuffs, and hem.





A few well known and selected stitches that can be used for this purpose are here illustrated and explained:—

EDUCATION DEPARTMENT, S.A. - DOMESTIC ARTS.

FANCY STITCHES.

- |                                                                                         |                                                                                         |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1.     | 2.    |
| 3.     | 4.    |
| 5.     | 6.    |
| 7.     | 8.     |
| 10.    | 11.   |
| 12.    | 13.    |
| 14.    | 17.    |
| 15.   | 18.   |
| 16.  | 20.  |
| 19.  | 22.  |
| 21.  | 24.  |
| 23.  | 25.  |
| 26.  | 27.  |
| 28.  | 30.  |
| 29.  | 31.  |

REFERENCE —

 = 1 colour.  = 2 colours  = 3 colours  = 4 colours



KEY TO STITCHES.

1. The "Z" stitch, large running stitch joined by hemming stitch.
2. The "Z" stitch linked by a row of tacking.
3. "Link" stitch, two rows of tacking joined by a "Cross" stitch, and linked with another row of tacking.
4. "Post and Rail" stitch, three rows of running, with two upright tacking stitches.
5. The "V" stitch, hemming two ways.
6. The "Diamond" stitch, two rows of "V" stitch overlapping.
7. The "Step" stitch, horizontal and upright darning.
8. The single chain stitch.
9. "Magic" chain, the chain stitch worked in two colors.
10. "Laced" chain, the single chain stitch, laced with a different color.
11. "Double" chain, the chain stitch worked openly.
12. "Zig Zag" chain, the chain stitch worked on the slant.
13. "Blanket" stitch.
- 14, 15, 16, 17, 18. Variations of "Blanket" stitch, suitable for hems.
19. "Laced" blanket, simple lacing into "Blanket" stitch.
20. "Battlement" stitch, three rows of "Blanket" stitch done on the slant.
21. "Star" stitch, cross stitch, running through the cross and upright tacking.
22. Laced Herringbone stitch.
23. Lazy-daisy stitch.
24. "Y" stitch, open lazy-daisy stitch.
25. "Feathery" stitch, the lazy-daisy stitch worked closely together.
26. "Gable" stitch, two rows of arrow stitch with a tacking stitch.
27. "Sun" stitch, lazy-daisy stitch worked in half-circles.
28. "Leaf" stitch, lazy-daisy stitch and a darning stitch.
29. French knots.
30. "Tent" stitch, lazy-daisy hemming, and French knots.
31. Bullion stitch.

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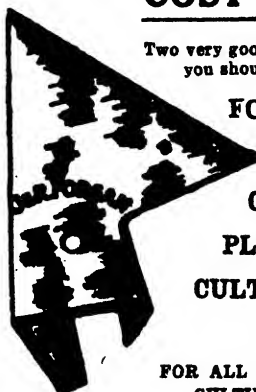
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## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### PINNAROO LINE FARMERS' CONFERENCE.

The Seventeenth Annual Conference of Branches of the Agricultural Bureau situated on the Pinnaroo Line was held at Lameroo, on Thursday, August 1st, 1930. The Department of Agriculture was represented by Messrs. F. Coleman (Chairman), P. H. Jones, (Member, Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), R. L. Griffiths (District Agricultural Instructor), A. H. Robin, B.V.Sc. (Government Veterinary Officer), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary). Delegates were present from the Pinnaroo, Parilla Well, Parilla, Clanfield, Geranium, Parrakee, and Marama Branches of the Agricultural Bureau. Mr. J. L. Koch (Chairman of the Lameroo Branch) occupied the chair, and extended a cordial welcome to officers of the Department and delegates from neighboring Branches. Mr. F. Coleman delivered the opening address. The following papers were read and discussed:—"Conservation of Fodder," Mr. A. Young (Pinnaroo); "Rural Organisation," Mr. L. Orwell (Clanfield); "Marketing Wheat by Grades," Mr. H. Davis (Pinnaroo); "Stabilising Primary Products," Mr. R. McKenzie (Pinnaroo); "Wheats for the Mallee Lands," Mr. A. Fischer (Pinnaroo); "Economy on the Farm," Mr. H. Johnson (Parilla); "Grow More Wheat," Mr. R. Jacob (Geranium).

Mr. F. Coleman presented the following trophies, won in the 1929 Chandos Crop Competition:—First Prize—Mr. W. N. Cross (Geranium), 93 points, silver cup; Second Prize—Mr. A. Beelitz (Parrakee), 92½ points, set of stainless knives; Third Prize—Mr. W. E. Beelitz (Jabuk), pair of electroplated vases; Fourth Prize—Mr. E. Williams (Jabuk). A handsome silver cup was presented to Mr. M. R. Fraser, of Jabuk, who secured the highest aggregate of points in the competition over the seasons 1927, 1928, and 1929. For a Junior Competition, a trophy consisting of a writing desk was donated by Mr. F. R. Koch, of Wilkawatt, for farmers' sons under 17 and not over 21 years of age. The competition was won by Mr. V. Polkinghorne, of Geranium. Mr. Koch was the recipient of many sincere congratulations for the interest that he had shown in donating a prize for competition amongst the young men of the Pinnaroo Line District.

During the session devoted to Free Parliament many questions were answered by Departmental officers, and the following resolutions were carried:—(a) "That the reduced freights in operation at the present time for the carriage of super be extended until the 1st of June." (b) "That the Government be asked to introduce a scheme to provide subsidies for the purchase of draught stallions." (c) "That the 1931 Conference should be held at Pinnaroo." (d) "That all Agricultural Instructors be eligible to judge agricultural exhibits at shows if required." (e) "That in view of the high cost of production and low prices prevailing for wheat this Conference strongly recommends to the wheat merchants and wheat pool that the agents' receiving fee be reduced by ½d. per bushel." (f) "That before any further expense is incurred to make provision of carriage of heavy freight on the Tailem Bend-Adelaide railway line, a full investigation as to the possibility of a southern or Murray port be made." (g) "That this Conference resolves that it be made possible to obtain a transfer from one Branch to another instead of having to be re-nominated."

A special session was held for women. Mrs. Koch presided, and delegates were present from the Pinnaroo, Parilla, Parilla Well, and Wilkawatt Branches. The following papers were read and discussed:—"Butter Making," Mrs. C. Phillis (Parilla); "Domestic Art in the Home," Mrs. H. Fewings (Pinnaroo); "Utilisation of Cold Meat," Mrs. C. Mattiske (Pinnaroo).



### CONFERENCE AT MURRAY BRIDGE.

The Annual Conference of Branches of the Agricultural Bureau situated in the Southern Districts of the State was held at Murray Bridge on August 20th. Mr. G. Jeffrey (Member Advisory Board of Agriculture), Prof. A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), P. H. Suter (Dairy Instructor), C. T. McKenna, B.V.Sc. (Government Veterinary Officer), R. Hill, and E. Leishman (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary, Agricultural Bureau) represented the Department of Agriculture. There was an excellent attendance of delegates from the following Branches:—Monarto South, Hartley, Rapid Bay, Murray Bridge, Strathalbyn, Milang, Brinkley, Bowhill, Rockwood, Coomandook, Blackheath, Langhorne's Creek, Port Elliot, and Shoal Bay. Mr. Wells, President of the local Branch, presided over the Conference. The President's remarks were supported by Mr. Homberg (Mayor of Murray Bridge), who extended a civic welcome to the visitors. The opening address was delivered by Mr. G. Jeffrey (Member Advisory Board of Agriculture).

The following papers were read and discussed:—"Increasing Farm Production," Mr. E. W. Pearson (Brinkley); "Experimental Farms and Their Value," Mr. L. Rust (Brinkley); "Fencing," Mr. R. Borrett (Langhorne's Creek); "Dairying in South Australia in Relation to the World's Markets," Mr. E. Fromen (Manager Dairy Department South Australian Farmers' Union); "Summer Dairying," Mr. J. M. Hudd (Bletchley); "Finance and Farm Bookkeeping," Mr. H. Kuchel (Murray Bridge); "Dairying in conjunction with Mixed Farming," Mr. A. White (Port Elliot).

During "Free Parliament" the following resolutions were carried:—

Invitations were received from Kangaroo Island, Strathalbyn, and Langhorne's Creek as centres for the 1931 Conference. It was decided to hold the next gathering at Langhorne's Creek. It was also decided that the Advisory Board endeavor to arrange for a Conference on Kangaroo Island towards the end of March, 1931. "That this Conference strongly recommends that the present Government maintain the present agricultural institutions and officers and staff connected with the rural industry, which we consider is essential in the interests of the community and State in general, and we strongly urge the Advisory Board to bring this before the Government at the earliest opportunity." "That immediate steps be taken to call a Dairymen's Conference, where all phases of the industry can be discussed, and that the Conference be held in Adelaide." "That the Dairy Cattle Improvement Act, 1921, be amended by substituting the words 'nine months' in place of 'six months' when referring to the licensing of bulls." "That

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the wild or bitter melon be placed on the Noxious Weeds Act." "That the destruction of African boxthorn be compulsory." "That discussions on subjects of economical importance to the man on the land, even though of political flavor, be allowed at Bureau meetings."

Departmental officers replied to numerous questions, and Conference concluded with an address, "Dairying in the Murray Valley," by Mr. H. B. Barlow (Chief Dairy Instructor).

### HILLS PRODUCERS IN CONFERENCE.

An excellent representation of delegates of Branches of the Agricultural Bureau met in Conference at Balhannah on August 28th. Delegates to the number of over 100 were present from the following Branches:—Ironbank, Uraidla, Clarendon, Lenswood, Blackwood, Balhannah, Gumeracha, Mount Pleasant, Tweedvale, Cherry Gardens, Longwood, and Scott's Bottom.

The Department of Agriculture were represented by Messrs. H. N. Wicks, H. S. Taylor, P. H. Jones, J. W. Sandford (members Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), W. J. Spafford (Deputy Director of Agriculture), Geo. Quinn (Chief Horticultural Instructor), H. B. Barlow (Chief Dairy Instructor), District Instructors, and the General Secretary (Mr. H. C. Pritchard).

The Conference was presided over by Mr. E. Mattner, of the Balhannah Branch. Mr. H. N. Wicks (Vice-Chairman of the Advisory Board of Agriculture) delivered the opening address.

Keen discussions arose from the reading of the following papers:—"Manures and Fruit Growing," Mr. A. Peacock (Balhannah); "Dairying," Mr. E. Mattner (Balhannah); "Marketing Amendments," Mr. W. Bishop (Lenswood); "The Carol Bean," Mr. V. Tapscott (Mount Pleasant).

During "Free Parliament" the following resolutions were carried:—

(a) "That there be no open season for opossums and that landholders be the only persons allowed to take opossums on their own property." (b) "That this Conference requests that, considering the damage done by the fox, the month of March be set aside for the simultaneous destruction of foxes, and that it be an offence to liberate any fox." (c) "It was decided that the 1931 Conference be held at Mount Pleasant." (d) "That the Waite Agricultural Research Institute be requested to initiate research work into the development of the fruit buds in the apple, with a view to determining as to what period the wood bud changes into the fruit bud." (e) "That Branches of the Agricultural Bureau form Advisory Committees to advise new settlers coming into the district of the capabilities of land which they intend to take up." (f) "This meeting desires to place on record its appreciation of the good work carried on in the Blackwood Experimental Orchard and trusts that the Government finds sufficient funds to ensure continuity of this work." (g) "That this Conference heartily supports the action taken by the Fruitgrowers' and Market Gardeners' Association in their efforts to bring about a better position from the fruitgrowing point of view in the sugar industry." (h) "That this Conference emphatically disapproves of the present agreement between the Commonwealth Government and the Queensland sugar interests, and strongly urges that the agreement be not renewed." (i) "That the Advisory Board of Agriculture be requested to bring the foregoing resolution under the notice of the Sugar Inquiry Committee appointed by the Prime Minister." (j) "That steps be taken to investigate the possibility of controlling fruit crops by systematic manuring."

The evening session was occupied with an address, illustrated with lantern slides, "Principles of Pasture Improvement," by Mr. H. Trumble, M. Agric. Sc., Waite Research Institute).



## ADVISORY BOARD OF AGRICULTURE.

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The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, August 27th, there being present Messrs. F. Coleman (Chairman), H. N. Wicks (Vice Chairman), J. W. Sandford, R. H. Martin, H. S. Taylor, P. H. Jones, A. L. McEwin, S. Shepherd, G. Jeffrey, Prof. A. J. Perkins (Director of Agriculture), Dr. A. E. V. Richardson (Director, Waite Research Institute), Messrs. W. R. Birks (Principal, Roseworthy Agricultural College), and H. C. Pritchard (Secretary). An apology was received from Mr. A. J. Cooke.

*Root Gall in Fruit Trees.*—Mr. Geo. Quinn (Chief Horticultural Instructor) submitted the following report on a resolution of last year's Conference of Hills Branches that the Department of Agriculture take immediate steps to ascertain the cause and remedy of root gall in fruit trees, &c.:—"I have to report that this matter was taken up some years ago by the Horticultural Branch in conjunction with Professor Osborn, Professor of Botany and Parasitology of the University of Adelaide. Samples of the galls were supplied to him from time to time in all stages of growth, and he endeavored to determine if the cause was an organism, as had been claimed in the United States of America for a similar defect. I understand Professor Osborn isolated a bacterial organism from the fresh tissues of a gall which he thought would be found to be identical with the *Pseudomonas tumefaciens* described by Erwin Smith and Townsend and other American Plant Pathologists. The removal soon afterwards of Professor Osborn to the University of Sydney precluded further bacteriological study on the subject. With a view to endeavoring to ascertain the possibilities of the dissemination of the gall by ordinary orchard practices, such as pruning the plants and tilling the soil, I secured specimens of young apple trees from local sources, and from nursery stock ex-Victorian nurseries affected by fresh growing galls on their roots. Two dozen young trees of apple, almond, and loquat were secured, all of which were apparently free from the gall. The bark on the stems of half of these trees was sliced and raised to expose the sap layers just below ground level, and the scraped juice and thin slices of tissue of the freshly cut galls introduced beneath it, prior to tying the bark back into close contact with the cambium. The other half of the trees, which were used as checks, were similarly sliced with a sterilised knife only, and tied back in a like manner. Both lots were planted side by side in the vinery at the Adelaide Experimental Orchard. Along with the above, two apple trees, on the roots of which fresh galls were growing, were planted side by side with two clean rooted apple trees, and afterwards the sliced surfaces of fresh galls were tied and bound under the overlapping bark of their stems, below ground level. Thirteen months later all of the trees were very carefully dug up and the soil hosed off the roots. In no instance had the slicing caused infection to be transmitted to the clean trees, and the intergrafted gall had dried and crumbled to powder under pressure, though still adhering to the roots of their respective original host trees. The American investigators have transmitted through pure cultures their crown or root gall organism from various fruit trees to others, as well as to many common garden plants, and produced the galls on them both above and below the ground. In California it is claimed quite 70 per cent. of the soils are infected by this or similar forms of Bacteria, and trees planted therein are infected suspectedly through wounds made into the sap bearing tissues. The incidence of the gall found here commences in a small wart-like growth on the roots, such as is



caused by eelworms or Bacteria, in the case of the roots of legumes. It rapidly enlarges and grows throughout the vegetative season of the host plant, and then the outer and greater bulk dries up into hardened semi-woody mass, in which the tissues are twisted and superimposed into a multitude of irregular, over-lapping, short folds. It is evident the tree building material concentrated to the injured spot has been prevented from forming normally co-ordinated groups of cells capable of maintaining life. Although the galls may assume such large dimensions, a close examination usually reveals the fact that the connecting tissue between the host and a large gall may not be thicker than the cross section of a pencil, or approximately  $\frac{1}{4}$  in. My observations lead me to conclude that the defect is much more abundant on trees planted on sandy soils in warm districts. Among the stone fruits, the almond, peach, and plum are more attacked than the apricot; the pear appears particularly susceptible to gall injuries, and the apple not nearly so, in fact, it has not come under my notice on mature apple trees. Citrus trees, if attacked at all, are never reported as seriously injured. The location on the tree of the gall is of the utmost importance. If attached to the collar or crown where the stem and roots meet, there is great danger of the tree being totally ruined. If the galls are attached to roots a foot or more away from the stem, trees may be infected for many years without displaying any particular disability in consequence. I have dug up several galls ranging from the size of a clenched fist to as large as a child's head attached to roots not thicker than a human finger, and yet the fifteen year old peach tree host gave no sign of inconvenience therefrom and continued to progress for years afterwards, though other galls were subsequently unearthed. As far as remedial measures have been applied, it is indicated that planters should examine young nursery stock for the presence of galls on the roots or crowns, and carefully cut away any found there before planting the trees. As seldom any evidence is found on the young trees at planting time, they should be watched during the first few years for the appearance of any gall-like callosities showing on the stem above the root crown. If any are seen, they should be carefully cut away into the healthy sap layers below, using a sharp chisel or knife, and an antiseptic dressing such as Bordeaux paint (consisting of 1½ lbs. of copper sulphate and 3 lbs. of lime in 2 galls. of water) should be applied to the wounded surface, before painting it over with lead paint, tar, or asphaltum, to ward off moisture. In California, some growers claim if the trees are carried safely over the first five or six years they are usually safe from gall attacks afterwards. In respect to replanting over the positions where gall diseased trees have been removed, our experience at the Experimental Orchard at Berri may be worth citing. There, a number of pear trees developed huge crown galls below the surface, and when the stunting effect on the tops began to indicate something amiss, excavation revealed the cause. Several of these trees were dug out during the summer and the ground excavated for replanting the following winter. When the soil was filled in again the galls, which were also found on the roots, were pulverised and mixed with the soil into which, other apparently clean young pear trees were planted. About four years later these young trees, which were still growing nicely, were dug up, and it was found that some of their roots carried galls varying from about the size of a grape berry to that of a fowl's egg. Whether, in this instance, the remains of the old galls or the soil itself was the cause of this infection I am unable to say, but the fact remains as stated. At any rate, no harm would be done by collecting and burning over the spot all of the excavated roots and galls, together with any other trash calculated to sterilise the soil about to be replaced when re-planting."

*Resolutions from Conferences, Pinnaroo Line Branches.*—(a) "That this Conference resolves that it be made possible to obtain a transfer from one Branch to another instead of having to be re-nominated." Branches of the Bureau are informed that a transfer from one Branch to another will be effected on application being made to the General Secretary. (b) "That in view of the high cost of production and low prices



prevailing for wheat, this Conference strongly recommends to the wheat merchants and wheat pool that the agents' receiving fee be reduced by  $\frac{1}{4}$ d. per bushel." It was decided to bring the resolution under the notice of the Corn Trade Section of the Chamber of Commerce, and the Wheat Pool. (c) "That the Government be asked to introduce a scheme to provide subsidies for the purchase of draught stallions." (d) "That the reduced freights in operation at the present time for the carriage of super be extended until the 1st of June." (e) "That before any further expense is incurred to make provision of carriage of heavy freight on the Tailem Bend-Adelaide Railway Line, a full investigation as to the possibility of a Southern or Murray Port be made." Resolutions c, d, and e were received.

*Agricultural Instructors Judging at Country Shows.*—The decision of the Hon. Minister disallowing Instructors to act as judges at country shows was received with regret.

*Resolutions from Conference of Southern Branches.*—(a) "That immediate steps be taken to call a Dairymen's Conference, where all phases of the industry can be discussed, and that the Conference be held in Adelaide." It was decided that the matter be left in the hands of the General Secretary to arrange a Conference at a suitable time and place, with Branches interested in the Dairying Industry. (b) "That the Advisory Board of Agriculture endeavor to arrange for a Conference to be held on Kungaroo Island, towards the end of March, 1931." The Secretary was instructed to bring the matter forward at the November meeting of the Board. (d) "That the destruction of African boxthorn be compulsory." (e) "That the wild or bitter melon be placed on the Noxious Weeds Act." It was decided to transmit resolutions d and e to the District Councils' Association. (f) "That the Dairy Cattle Improvement Act, 1921, be amended by substituting the words 'nine months' in place of 'six months' when referring to the licensing of bulls." It was decided to refer the resolution to the Dairy Cattle Improvement Committee. (g) "That this Conference strongly recommends that the present Government maintain the present agricultural institutions and officers and staff connected with the rural industry, which we consider is essential to the interests of the community and State in general, and we strongly urge the Advisory Board to bring this matter under the notice of the Government at the earliest opportunity." The Secretary was instructed to forward the resolution to the Minister with the indorsement of the Board. (h) "That discussions on subjects of economical importance to the man on the land, even though of political flavor, be allowed at Bureau Meetings." The Secretary was asked to publish in the *Journal* a statement pointing out that matters relating to phases of political economy could be discussed at Branch meetings, but such discussions must not be allowed to develop into debates on party politics.

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*Subsidies for Crop Competitions.*—The Paruna Branch forwarded the following resolution:—"That this Branch protests against the action of the Government in discontinuing the subsidy on the crop competitions and asks the Department of Agriculture to approach the Government asking them to reconsider their action. It was pointed out that it was not a very big expense to the Government and asked for its continuance." The resolution was received.

*Location of District Instructor.*—At the Ceduna Conference a resolution was passed that the Agricultural Instructor for that district should be stationed in a more central position. The Secretary was instructed to advise the Branch that it was not thought practicable nor advisable to alter the present arrangements.

*Compilation of Records of Work at Blackwood Experimental Orchard.*—It was decided to defer consideration of this matter for another six months.

*Berri Experimental Orchard.*—The Berri Branch forwarded the following resolution:—"That this meeting of Monash and Berri growers fully appreciates the work that is being carried out at the Berri Experimental Orchard on behalf of the fruit industry, and that any curtailment of the good work being done there we view with alarm, as it would be a setback to the fruit industry along the river; and that a yearly grant be made to the Director of Agriculture to cover the necessary expenses in connection with experimental work at the orchard." The Secretary was instructed to forward the resolution to the Minister with the support of the Board, and to state that members note with pleasure this expression of confidence in the work being performed at the orchard.

*Services of Mr. A. V. Lyon.*—The Berri Branch also resolved—"That the Agricultural Department be approached through the Advisory Board asking them to move in the matter of getting Mr. Lyon on the Merbein Research Station to visit Berri and address the growers." As Mr. Lyon is a Commonwealth officer engaged specifically for research work, it was decided not to take any action in this matter. The Branch to be informed that as the results of the research work were made available the information would be published.

*Farm Book-keeping.*—At a meeting of the Streaky Bay Branch, held on July 25th one member spoke on the necessity of farmers keeping books, but considered that the usual system was too complicated for the ordinary farmer, and suggested that the Advisory Board of Agriculture endeavor to bring out a simplified form, suitable for farm business, and be a standard method. Agricultural Instructors to be asked to help farmers to use the method. It was decided to ask the Director to report on the request.

*Board Representation at Conferences.*—On the motion by Mr. Jeffrey, seconded by Mr. P. H. Jones, it was decided that in view of the financial position only one member represent the Board in an official capacity at future country Conferences. It was agreed that more than one member could attend, but that the Department would not be called upon to pay expenses other than for the member appointed by the Board to attend. In the case of requests which were received in the period between meetings of the Board for members to attend meetings of Branches, the Chairman and the Secretary were authorised to deal with the matter.

*Life Members.*—The names of Messrs. R. J. Rose (Laura) and V. Wake (Elbow Hill) were added to the rolls of Life Members of the Agricultural Bureau.

*New Branches.*—Approval was given for the formation of Branches of the Agricultural Bureau at Greenock and Warcowie (Women's).



## DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported on September 1st, 1930:—

**BUTTER.**—The very favorable conditions in the dairying industry have resulted in a rapid increase in production, and this State for some weeks past has had a surplus, which is being exported to London. Last week substantial shipments were made by the *Mooltan* and *Esperance Bay*. The London market is weak and choicest quality is now quoted there at 124s. to 126s. per cwt., but sales are slow. This decline in price has been reflected in values here, and choicest quality in bulk is now realising 1s. 4½d. Second and third grades, 1s. 2½d. (These prices are subject to the stabilisation levies). Best separators, 1s. 1½d. to 1s. 2½d.; well conditioned stores and collectors, 10½d. to 11½d. per lb.

**EGGS.**—As usual at this time of the year, quantities are showing an increase each week, and this State now has a considerable surplus which is being taken up by pulpers and exporters. Already shipments to London have been made, and as both pulpers and packers are operating freely all consignments coming to hand have been cleared, and the market is steady. Ordinary country eggs, hen, 7d. per dozen; duck, 8d. per dozen.

**CHEESE.**—The season in the South-East promises to be exceptionally good, and it is expected that there will be a heavy milk production. Quantities arriving from the South-East are increasing each week, but with a steady local demand combined with a fair interstate sale, stocks are reasonably cleared. New makes, large to loaf, 8½d. to 8½d. per lb.; semi-matured and matured, to 1s. per lb.

**ALMONDS.**—Only small quantities are arriving, and there is a good demand for all shell lines. Kernels are also in good request. As most of last season's crop has been cleared, stocks are only light. Brandis, 8d. to 8½d. per lb.; mixed softshells, 7d. to 7½d.; hardshells, 4d. to 4½d.; kernels, 1s. 7½d. per lb.

**HONEY.**—Owing to fairly heavy stocks being carried in the other States, there has not been much exported from South Australia, and locally the demand is only fair. Sales are practically limited to prime clear extracted, and there is a surplus of lower grades which is difficult to quit even at low prices. Prime clear extracted in liquid condition, 4½d. to 5d.; best quality candied lots, 4½d. to 4½d.; second-grade honey, 2½d. to 3d. per lb.

**BEESEX.**—No alteration to report. Sales are slow, 1s. 5d. to 1s. 5½d. per lb. according to sample.

**BACON.**—There are ample stocks of bacon held by all curers at present, as supplies of live hogs to the markets have been good. Although the turnover is being steadily maintained in bacon, the demand for hams is somewhat slow. Best local sides, 11½d. to 1s.; best local factory cured middles, 1s. 1d. to 1s. 1½d.; large, 10d.; local rolls, 10½d. to 11d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 5d.; local, 1s. to 1s. 1½d.; "Sugar Cane" lard, in packets, 11d. per lb.; in bulk, 10d. per lb.; local lard, 9d. per lb. in prints.

**LIVE POULTRY.**—There has been a good demand for all classes of poultry during the month, and although our sales each week have been well supplied with consignments from the country and suburban yards, the demand has been sufficient to absorb all lots at satisfactory prices. We advise consigning. Crates loaned on application. Prime roosters, 4s. 6d. to 5s. 6d.; nice-conditioned cockerels, 3s. 6d. to 4s. 3d.; fair-conditioned cockerels, 2s. 7d. to 3s. 3d.; chickens, lower; heavy-weight hens, 3s. 3d. to 4s.; medium hens, 2s. 6d. to 3s.; light hens, 2s. to 2s. 4d.; couple of pens of weedy sorts, lower; geese, 4s. to 5s. 6d.; prime young Muscovy drakes, 4s. to 5s. 3d.; ducks, good conditioned, 3s. to 3s. 9d.; ducks, fair condition, 2s. to 2s. 9d.; ducklings, lower; turkeys, good to prime condition, 8½d. to 11d. per lb. live weight; turkeys, fair condition, 7d. to 8d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 6d. each.

**POTATOES.**—Prime Victorians Red Soil Snowflakes, 8s. per cwt.

**ONIONS.**—Best brown, 6s. per cwt.



| Federal Commerce Act. |       | Packages. |
|-----------------------|-------|-----------|
| England—Apples        | ..... | 500       |
| Oranges               | ..... | 71        |
| India—Apples          | ..... | 350       |
| New Zealand—Oranges   | ..... | 40        |
| Lemons                | ..... | 165       |
| Java—Apples           | ..... | 252       |



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of August, 1930, also the average precipitation to the end of August, and the average annual rainfall.

| Station.                   | For Aug. 1930. | To end Aug. 1930. | Av'ge to end Aug. | Av'ge Annual Rain-fall. | Station.              | For Aug. 1930. | To end Aug. 1930. | Av'ge to end Aug. | Av'ge Annual Rain-fall. |
|----------------------------|----------------|-------------------|-------------------|-------------------------|-----------------------|----------------|-------------------|-------------------|-------------------------|
| FAR NORTH AND UPPER NORTH. |                |                   |                   |                         | LOWER NORTH—continued |                |                   |                   |                         |
| Oodnadatta .....           | 0.48           | 1.60              | 3.19              | 4.78                    | Brinkworth ....       | 2.35           | 7.90              | 10.78             | 16.01                   |
| Marree .....               | 0.33           | 3.32              | 3.84              | 5.92                    | Blyth .....           | 2.41           | 7.21              | 11.56             | 16.94                   |
| Farina .....               | 0.43           | 3.70              | 4.46              | 6.53                    | Clare .....           | 3.46           | 13.09             | 17.16             | 24.67                   |
| Copley .....               | 0.63           | 4.80              | 5.52              | 8.04                    | Mintaro .....         | 3.96           | 12.69             | 16.11             | 23.51                   |
| Beltana .....              | 0.54           | 4.20              | 5.87              | 8.68                    | Watervale .....       | 3.16           | 10.68             | 18.92             | 27.24                   |
| Blinman .....              | 1.16           | 5.16              | 8.44              | 12.12                   | Auburn .....          | 4.32           | 11.92             | 16.70             | 24.12                   |
| Hookina .....              | 1.41           | 5.02              | 7.97              | 11.85                   | Hoyleton .....        | 1.77           | 5.96              | 11.97             | 17.56                   |
| Hawker .....               | 1.46           | 5.28              | 8.56              | 12.43                   | Balaklava .....       | 1.89           | 6.27              | 10.73             | 15.99                   |
| Wilson .....               | 1.38           | 5.17              | 8.14              | 12.01                   | Port Wakefield ..     | 1.52           | 5.11              | 9.34              | 13.08                   |
| Gordon .....               | 1.33           | 5.76              | 7.26              | 10.89                   | Terowie .....         | 2.38           | 4.67              | 8.89              | 13.58                   |
| Quorn .....                | 2.12           | 5.50              | 9.34              | 13.60                   | Yarcowie .....        | 1.88           | 4.89              | 9.24              | 13.83                   |
| Port Augusta ....          | 0.95           | 3.69              | 6.36              | 9.50                    | Hallett .....         | 3.32           | 7.73              | 11.04             | 16.55                   |
| Bruce .....                | 1.81           | 5.46              | 6.56              | 10.10                   | Mount Bryan ..        | 3.69           | 8.42              | 11.31             | 16.87                   |
| Hammond .....              | 2.19           | 4.86              | 7.64              | 11.54                   | Burra .....           | 3.34           | 8.10              | 12.27             | 18.00                   |
| Wilmington .....           | 2.39           | 6.66              | 12.32             | 17.78                   | Farrell's Flat ..     | 3.19           | 8.10              | 12.97             | 18.82                   |
| Willowie .....             | 2.75           | 9.45              | 8.02              | 12.27                   |                       |                |                   |                   |                         |
| Melrose .....              | 3.09           | 9.18              | 16.26             | 23.15                   | WEST OF MURRAY RANGE. |                |                   |                   |                         |
| Booleroo Centre...         | 1.61           | 7.71              | 10.40             | 15.41                   | Manoora .....         | 3.14           | 9.54              | 12.74             | 18.97                   |
| Port Germein ....          | 1.59           | 6.06              | 8.46              | 12.56                   | Saddleworth ...       | 3.32           | 10.63             | 13.51             | 19.65                   |
| Wirrabara .....            | 3.03           | 8.13              | 13.39             | 19.47                   | Marrabel .....        | 4.08           | 10.95             | 13.70             | 19.92                   |
| Appila .....               | 2.01           | 5.91              | 9.88              | 15.01                   | Riverton .....        | 3.87           | 9.83              | 14.43             | 20.86                   |
| Cradock .....              | 1.56           | 5.96              | 7.39              | 11.00                   | Tarlee .....          | 3.05           | 9.28              | 12.35             | 18.16                   |
| Carrieton .....            | 1.99           | 6.72              | 8.41              | 12.47                   | Stockport .....       | 3.53           | 9.68              | 11.29             | 16.88                   |
| Johnburg .....             | 2.49           | 6.04              | 6.97              | 10.69                   | Hamley Bridge ..      | 2.65           | 8.37              | 11.36             | 16.67                   |
| Eurelia .....              | 2.67           | 5.72              | 8.74              | 13.14                   | Kapunda .....         | 3.26           | 9.88              | 13.62             | 19.92                   |
| Orroroo .....              | 2.69           | 6.17              | 9.18              | 13.36                   | Freeling .....        | 2.91           | 9.01              | 12.24             | 18.03                   |
| Nackara .....              | 3.31           | 6.37              | 7.62              | 11.71                   | Greenock .....        | 3.34           | 11.16             | 14.76             | 21.76                   |
| Black Rock .....           | 2.52           | 5.69              | 8.46              | 12.57                   | Truro .....           | 3.20           | 9.49              | 13.84             | 20.21                   |
| Oodlawirra .....           | 2.65           | 6.48              | —                 | *                       | Stockwell .....       | 3.38           | 10.93             | 13.79             | 20.30                   |
| Peterborough ....          | 2.13           | 5.24              | 8.83              | 13.40                   | Nuriootpa .....       | 3.47           | 11.05             | 14.22             | 20.74                   |
| Yongala .....              | 2.44           | 6.67              | 9.59              | 14.57                   | Angaston .....        | 3.61           | 11.42             | 15.50             | 22.58                   |
|                            |                |                   |                   |                         | Tanunda .....         | 3.30           | 10.85             | 15.43             | 22.20                   |
| NORTH-EAST.                |                |                   |                   |                         | Lyndoch .....         | 3.93           | 12.39             | 16.30             | 23.71                   |
| Yunta .....                | 1.37           | 3.30              | 5.66              | 8.53                    | Williamstown...       | 4.77           | 14.93             | 19.92             | 27.84                   |
| Waukaranga .....           | 0.53           | 3.00              | 5.45              | 8.38                    |                       |                |                   |                   |                         |
| Mannahill .....            | 0.43           | 4.74              | 5.48              | 8.39                    | ADELAIDE PLAINS.      |                |                   |                   |                         |
| Cockburn .....             | 0.38           | 2.66              | 5.42              | 8.04                    | Owen .....            | 2.49           | 8.65              | —                 | *14.22                  |
| Broken Hill, N.S.W.        | 0.61           | 4.25              | 6.58              | 9.71                    | Mallala .....         | 2.19           | 7.82              | 11.53             | 16.77                   |
|                            |                |                   |                   |                         | Roseworthy ....       | 2.92           | 8.76              | 11.89             | 17.46                   |
| LOWER NORTH.               |                |                   |                   |                         | Gawler .....          | 2.73           | 9.27              | 13.33             | 19.14                   |
| Port Pirie .....           | 1.56           | 5.14              | 9.07              | 13.38                   | Two Wells .....       | 2.11           | 7.67              | 11.18             | 15.88                   |
| Port Broughton ..          | 1.99           | 6.76              | 9.87              | 14.08                   | Virginia .....        | 2.25           | 8.28              | 12.14             | 17.30                   |
| Bute .....                 | 1.86           | 6.91              | 11.03             | 15.56                   | Smithfield .....      | 2.72           | 9.34              | 11.97             | 17.58                   |
| Laura .....                | 2.26           | 6.99              | 12.30             | 18.20                   | Salisbury .....       | 3.21           | 10.15             | 13.22             | 18.63                   |
| Caltowie .....             | 2.35           | 6.85              | 11.27             | 16.94                   | Adelaide .....        | 3.52           | 11.46             | 15.18             | 21.16                   |
| Jamestown .....            | 2.68           | 7.78              | 11.94             | 17.95                   | Glen Osmond ..        | 4.07           | 13.28             | 18.81             | 26.19                   |
| Gladstone .....            | 2.62           | 6.96              | 10.97             | 16.44                   | Magill .....          | 4.32           | 13.80             | 18.36             | 25.77                   |
| Crystal Brook ....         | 2.57           | 7.14              | 10.83             | 15.89                   |                       |                |                   |                   |                         |
| Georgetown .....           | 2.63           | 8.21              | 12.61             | 18.53                   | MOUNT LOFTY RANGES.   |                |                   |                   |                         |
| Narridy .....              | 2.56           | 7.73              | 11.09             | 15.99                   | Teatree Gully...      | 4.46           | 12.84             | 19.50             | 27.70                   |
| Redhill .....              | 2.79           | 8.03              | 11.68             | 17.02                   | Stirling West ..      | 7.18           | 25.21             | 34.11             | 47.04                   |
| Spalding .....             | 2.80           | 6.71              | 12.72             | 19.53                   | Uraidla .....         | 6.03           | 21.11             | 32.21             | 44.38                   |
| Gulnare .....              | 3.25           | 8.26              | 12.56             | 18.92                   | Clarendon .....       | 5.05           | 16.99             | 23.90             | 33.03                   |
| Yacka .....                | 2.51           | 8.04              | 10.54             | 15.40                   | Morphett Vale ..      | 3.15           | 12.44             | 16.16             | 22.78                   |
| Koolunga .....             | 2.60           | 6.84              | 10.73             | 15.61                   | Noarlunga .....       | 3.14           | 10.87             | 14.77             | 20.49                   |
| Snowtown .....             | 2.56           | 7.17              | 11.01             | 15.78                   | Willunga .....        | 4.25           | 14.28             | 18.96             | 26.07                   |



## RAINFALL—continued.

| Station.                  | For Aug. 1930. | To end Aug. 1930 | Av'ge to end Aug. | Av'ge Annual Rain-fall. | Station.                      | For Aug. 1930. | To end Aug. 1930. | Av'ge to end Aug. | Av'ge Annual Rain-fall. |
|---------------------------|----------------|------------------|-------------------|-------------------------|-------------------------------|----------------|-------------------|-------------------|-------------------------|
| MOUNT LOFTY RANGES—contd. |                |                  |                   |                         | WEST OF SPENCER'S GULF—contd. |                |                   |                   |                         |
| Aldinga .....             | 3.71           | 10.71            | 14.70             | 20.43                   | Carrow .....                  | 1.61           | 5.15              | 8.71              | 13.                     |
| Myponga .....             | 5.80           | 18.30            | 20.64             | 29.62                   | Arno Bay .....                | 2.40           | 7.74              | 8.35              | 12.                     |
| Normanville .....         | 4.26           | 12.24            | 15.19             | 20.75                   | Cleve .....                   | 3.02           | 8.86              | 10.11             | 14.6.                   |
| Yankalilla .....          | 4.06           | 11.86            | 16.83             | 23.61                   | Cowell .....                  | 1.81           | 5.69              | 7.64              | 11.25                   |
| Mount Pleasant ..         | 5.62           | 14.83            | 19.24             | 27.38                   | Miltalie .....                | 1.98           | 7.20              | 9.32              | 13.89                   |
| Birdwood .....            | 5.72           | 15.67            | 20.74             | 29.41                   | Chandada .....                | 2.23           | 7.41              | —                 | —                       |
| Gumeracha .....           | 6.48           | 18.13            | 23.84             | 33.54                   |                               |                |                   |                   |                         |
| Millbrook Reservoir       | 5.73           | 17.61            | 24.78             | 36.18                   |                               |                |                   |                   |                         |
| Tweedvale .....           | 7.46           | 20.26            | 25.80             | 36.08                   | YORKE PENINSULA.              |                |                   |                   |                         |
| Woodside .....            | 5.95           | 16.64            | 22.90             | 32.47                   | Walleroo .....                | 2.48           | 6.90              | 10.14             | 13.99                   |
| Ambleside .....           | 6.52           | 18.40            | 24.87             | 35.09                   | Kadina .....                  | 2.35           | 6.89              | 11.43             | 15.77                   |
| Nairne .....              | 5.34           | 15.43            | 19.81             | 28.29                   | Moonta .....                  | 2.57           | 7.64              | 11.06             | 15.16                   |
| Mount Barker .....        | 7.75           | 20.93            | 22.43             | 31.66                   | Paskeville .....              | 2.29           | 6.39              | 11.29             | 15.67                   |
| Echunga .....             | 5.18           | 16.72            | 23.73             | 33.35                   | Maitland .....                | 3.50           | 10.25             | 14.59             | 20.03                   |
| Maaclesfield .....        | 4.70           | 14.77            | 21.29             | 30.72                   | Ardrossan .....               | 3.32           | 7.76              | 9.98              | 14.02                   |
| Meadows .....             | 5.18           | 17.27            | 25.61             | 36.42                   | Port Victoria ..              | 3.02           | 8.86              | 11.12             | 15.41                   |
| Strathalbyn .....         | 3.19           | 9.37             | 13.52             | 19.43                   | Curramulka .....              | 2.63           | 9.76              | 12.84             | 17.98                   |
|                           |                |                  |                   |                         | Minlaton .....                | 2.60           | 8.62              | 12.99             | 17.98                   |
| MURRAY FLATS AND VALLEY   |                |                  |                   |                         | Pt. Vincent .....             | 2.77           | 8.12              | 10.03             | 14.54                   |
| Meningie .....            | 2.28           | 8.85             | 13.11             | 18.52                   | Brentwood .....               | 2.80           | 8.33              | 10.96             | 15.67                   |
| Milang .....              | 1.87           | 7.26             | 10.57             | 15.13                   | Stansbury .....               | 2.85           | 8.35              | 12.09             | 16.95                   |
| Langhorne's Creek         | 2.59           | 9.04             | 9.95              | 14.84                   | Warooka .....                 | 3.23           | 9.87              | 13.02             | 17.67                   |
| Wellington .....          | 2.73           | 8.19             | 9.87              | 14.67                   | Yorke town .....              | 3.79           | 9.91              | 12.32             | 17.04                   |
| Tailem Bend .....         | 2.64           | 8.22             | 9.48              | 14.77                   | Edithburgh .....              | 2.73           | 7.82              | 11.85             | 16.52                   |
| Murray Bridge .....       | 1.92           | 6.15             | 9.19              | 13.84                   |                               |                |                   |                   |                         |
| Callington .....          | 2.63           | 7.89             | 10.42             | 15.40                   | SOUTH AND SOUTH-EAST.         |                |                   |                   |                         |
| Mannum .....              | 2.08           | 6.30             | 7.87              | 11.56                   | Cape Borda .....              | 7.25           | 20.71             | 19.44             | 24.81                   |
| Palmer .....              | 3.72           | 8.28             | 10.17             | 15.59                   | Kingscote .....               | 6.35           | 17.15             | 14.39             | 19.07                   |
| Sedan .....               | 2.60           | 6.78             | 8.33              | 12.24                   | Penneshaw .....               | 5.49           | 9.04              | 13.13             | 18.75                   |
| Swan Reach .....          | 1.65           | 4.87             | 6.91              | 10.77                   | Victor Harbor ..              | 4.11           | 12.12             | 15.32             | 21.32                   |
| Blanchetown .....         | 1.61           | 4.59             | 7.62              | 11.24                   | Port Elliot .....             | 2.96           | 9.71              | 14.00             | 20.05                   |
| Eudunda .....             | 3.85           | 9.80             | 11.67             | 17.19                   | Goolwa .....                  | 2.49           | 9.18              | 12.57             | 17.90                   |
| Sutherlands .....         | 2.51           | 6.52             | 6.44              | 10.87                   | Copeville .....               | 1.86           | 5.22              | —                 | 11.58                   |
| Morgan .....              | 1.30           | 5.33             | 5.88              | 9.23                    | Meribah .....                 | 1.66           | 5.78              | 6.77              | *11.70                  |
| Waikerie .....            | 1.46           | 6.19             | 6.20              | 9.71                    | Alawoona .....                | 1.83           | 5.99              | 6.83              | *10.20                  |
| Overland Corner ..        | 1.05           | 5.60             | 6.75              | 10.58                   | Mindarie .....                | 1.64           | 6.25              | 7.20              | 12.46                   |
| Loxton .....              | 1.86           | 6.57             | 7.66              | 11.80                   | Sandalwood .....              | 2.26           | 7.30              | 8.81              | 13.90                   |
| Renmark .....             | 1.36           | 5.13             | 6.65              | 10.60                   | Karoonda .....                | 3.16           | 8.29              | 9.37              | 14.48                   |
|                           |                |                  |                   |                         | Pinnaroo .....                | 2.30           | 6.35              | 9.82              | 14.94                   |
| WEST OF SPENCER'S GULF.   |                |                  |                   |                         | Parilla .....                 | 2.43           | 6.38              | 9.14              | 14.15                   |
| Eucla .....               | 1.64           | 11.41            | —                 | *                       | Lameroo .....                 | 2.89           | 7.88              | 10.61             | 16.33                   |
| Fowler's Bay .....        | 2.10           | 5.18             | 9.22              | 11.85                   | Parrakie .....                | 3.41           | 7.90              | 9.48              | 14.54                   |
| Penong .....              | 2.19           | 4.83             | 9.16              | 12.12                   | Geranium .....                | 3.67           | 8.76              | 11.02             | 16.54                   |
| Koonibba .....            | 1.61           | 5.17             | 9.04              | *                       | Peake .....                   | 3.10           | 8.01              | 10.89             | 16.41                   |
| Denial Bay .....          | 1.60           | 5.28             | 9.04              | *11.56                  | Cooke's Plains ..             | 2.48           | 7.82              | 10.36             | 15.46                   |
| Ceduna .....              | 1.67           | 5.41             | 7.17              | 9.92                    | Coomandook .....              | 2.99           | 8.33              | 11.67             | 17.45                   |
| Smoky Bay .....           | 1.42           | 3.89             | 7.91              | 10.61                   | Coonalpyn .....               | 2.28           | 8.39              | 11.99             | 17.52                   |
| Wirrulla .....            | 1.86           | 5.68             | —                 | *                       | Tintinara .....               | 2.51           | 8.55              | 12.71             | 18.78                   |
| Streaky Bay .....         | 1.95           | 5.92             | 11.57             | 14.95                   | Keith .....                   | 2.65           | 10.37             | 12.02             | 17.96                   |
| Talia .....               | 1.98           | 6.38             | 10.85             | 15.27                   | Bordertown .....              | 2.68           | 10.30             | 13.10             | 19.39                   |
| Port Elliston .....       | 2.71           | 6.60             | 8.70              | 16.53                   | Wolsley .....                 | 3.20           | 11.64             | 12.31             | 18.36                   |
| Port Lincoln .....        | 4.64           | 10.78            | 14.55             | 19.50                   | Frances .....                 | 4.34           | 13.32             | 13.34             | 19.96                   |
| Cummins .....             | 3.52           | 8.49             | 13.06             | 17.86                   | Naracoorte .....              | 4.10           | 15.34             | 15.45             | 22.57                   |
| Yeelanna .....            | 2.99           | 7.10             | 11.64             | 16.12                   | Penola .....                  | 5.50           | 17.02             | 18.15             | 26.19                   |
| Ungarra .....             | 3.16           | 9.12             | 11.52             | 16.85                   | Lucindale .....               | 3.94           | 15.25             | 16.36             | 23.07                   |
| Rudall .....              | 3.12           | 8.09             | 8.64              | *12.14                  | Kingston .....                | 3.96           | 15.83             | 17.92             | 24.40                   |
| Darke's Peak .....        | 3.08           | 8.28             | 10.37             | 15.13                   | Robe .....                    | 6.43           | 19.25             | 18.59             | 24.60                   |
| Kimba .....               | 2.25           | 7.45             | 8.00              | *11.92                  | Beachport .....               | 7.66           | 20.19             | 20.67             | 26.95                   |
| Kyancutta .....           | 2.00           | —                | —                 | 13.68                   | Millicent .....               | 7.01           | 20.71             | 21.97             | 29.70                   |
| Minnipa .....             | 2.14           | 6.78             | 10.46             | 14.68                   | Kalangadoo .....              | 7.43           | 21.09             | 22.55             | 32.30                   |
| Tumby .....               | 2.63           | 7.51             | 9.50              | 14.22                   | Mount Gambier ..              | 4.80           | 14.99             | 21.75             | 30.82                   |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

| Branch.                          | Report on Page. | Dates of Meetings. |      | Branch.                         | Report on Page. | Dates of Meetings. |      |
|----------------------------------|-----------------|--------------------|------|---------------------------------|-----------------|--------------------|------|
|                                  |                 | Sept.              | Oct. |                                 |                 | Sept.              | Oct. |
| Alawoona .....                   | †               | —                  | —    | Budunda .....                   | •               | 1                  | 6    |
| Aldinga .....                    | †               | —                  | —    | Eurella .....                   | †               | 13                 | 11   |
| Allandale East .....             | †               | 5                  | 3    | Eurella Women's .....           | †               | 3                  | 1    |
| Alma .....                       | †               | —                  | —    | Everard East .....              | †               | —                  | —    |
| Amyton .....                     | •               | —                  | —    | Farrell's Flat .....            | †               | 26                 | 31   |
| Angaston .....                   | •               | —                  | —    | Finniss .....                   | •               | —                  | —    |
| Appila .....                     | •               | —                  | —    | Gawler River .....              | •               | —                  | —    |
| Appila-Yarrowlie .....           | †               | 5                  | 3    | Georgetown .....                | •               | 6                  | 4    |
| Arthurton .....                  | •               | —                  | —    | Geranium .....                  | •               | 27                 | 25   |
| Ashbourne .....                  | •               | —                  | —    | Gladstone .....                 | †               | 5                  | 3    |
| Auburn .....                     | •               | —                  | —    | Gladstone Women's .....         | •               | 5                  | 10   |
| Auburn Women's .....             | †               | —                  | —    | Glencoe .....                   | •               | 9                  | 14   |
| Balaklava .....                  | †               | —                  | —    | Glossop .....                   | •               | —                  | —    |
| Balhannah .....                  | †               | —                  | —    | Goode .....                     | •               | 11                 | 9    |
| Barmora .....                    | •               | —                  | —    | Goode Women's .....             | 196             | —                  | —    |
| Beetaloo Valley .....            | •               | —                  | —    | Green Patch .....               | †               | 4                  | 2    |
| Belalie North .....              | †               | 8                  | 6    | Gulnare .....                   | †               | —                  | —    |
| Belalie Women's .....            | †               | —                  | —    | Gumeracha .....                 | †               | 8                  | 6    |
| Berri .....                      | •               | 10                 | 8    | Halidon .....                   | •               | —                  | —    |
| Big Swamp .....                  | •               | —                  | —    | Hanson .....                    | †               | —                  | —    |
| Blackheath .....                 | †               | 11                 | 9    | Hartley .....                   | •               | 3                  | 1    |
| Black Rock .....                 | 190             | —                  | 7    | Hawker .....                    | •               | 9                  | 7    |
| Black Springs .....              | 193             | 2                  | 7    | Hookina .....                   | •               | —                  | —    |
| Blackwood .....                  | †               | 8                  | 13   | Hoyleton .....                  | †               | 15                 | 20   |
| Block E .....                    | †               | —                  | —    | Inman Valley .....              | 206             | 18                 | 16   |
| Blyth .....                      | •               | 10                 | 17   | Ironbank .....                  | •               | —                  | —    |
| Booloroo Centre .....            | 191             | 5                  | 3    | Jamestown .....                 | †               | 22                 | 27   |
| Boolgun .....                    | 201             | 3                  | 2    | Kalangadoo Women's .....        | •               | 13                 | 11   |
| Boora Plains and Thrington ..... | •               | —                  | —    | Kalangadoo .....                | •               | 9                  | 14   |
| Borrika .....                    | •               | —                  | —    | Kalyan .....                    | 201             | 17                 | 15   |
| Bowhill .....                    | †               | 8                  | 6    | Kangarilla .....                | 206             | —                  | —    |
| Brentwood .....                  | †               | 4                  | 2    | Kangarilla Women's .....        | 206             | 18                 | 16   |
| Brinkley .....                   | †               | 3                  | 8    | Kanmantoo .....                 | •               | —                  | —    |
| Brinkworth .....                 | †               | 8                  | 6    | Kanni .....                     | 202             | —                  | —    |
| Brownlow .....                   | 193             | —                  | —    | Kapinnie .....                  | •               | —                  | —    |
| Buchanan .....                   | †               | —                  | —    | Kapunda .....                   | •               | 12                 | 10   |
| Bugle .....                      | 201             | 9                  | 14   | Karcultaby .....                | •               | —                  | —    |
| Bundaleer Springs .....          | •               | —                  | —    | Karoonda .....                  | •               | 10                 | 8    |
| Bunora .....                     | •               | 8                  | 8    | Kedth .....                     | •               | 4                  | 2    |
| Bute .....                       | •               | 18                 | 16   | Kelly .....                     | †               | 6                  | 4    |
| Butler .....                     | •               | —                  | —    | Ki Ki .....                     | †               | —                  | —    |
| Calca .....                      | †               | —                  | —    | Kilkerran .....                 | †               | 4                  | 2    |
| Cadell .....                     | •               | —                  | —    | Kengorrong .....                | †               | 8                  | 6    |
| Calph .....                      | †               | 2                  | 7    | Koolunga .....                  | 191             | 2                  | 7    |
| Canowie Belt .....               | •               | —                  | —    | Koonibba .....                  | •               | 4                  | 2    |
| Caralua .....                    | †               | 3                  | 1    | Koonunga .....                  | 191             | 2                  | 7    |
| Carrow .....                     | †               | 3                  | 8    | Koppio .....                    | †               | 8                  | 6    |
| Chandada .....                   | †               | 10                 | 17   | Kringin .....                   | †               | 8                  | 6    |
| Charra .....                     | •               | —                  | —    | Kulkawirra .....                | 202             | 9                  | 4    |
| Cherry Gardens .....             | 206             | 6                  | 4    | Kyancutta .....                 | †               | 2                  | 7    |
| Clanfield .....                  | •               | —                  | —    | Kybybolite .....                | †               | 4                  | 2    |
| Clare .....                      | •               | 2                  | 7    | Lameroo .....                   | 202             | 6                  | 4    |
| Clarendon .....                  | •               | 8                  | 6    | Langhorne's Creek .....         | †               | 3                  | 1    |
| Cleve .....                      | 196             | 4                  | 2    | Laura .....                     | †               | 6                  | 11   |
| Coddogla .....                   | •               | —                  | —    | Laura Bay .....                 | •               | —                  | —    |
| Coille .....                     | †               | 3                  | 1    | Lenswood and Forest Range ..... | 207             | —                  | —    |
| Coiton .....                     | •               | —                  | —    | Light's Pass .....              | 193             | 8                  | 6    |
| Coomandook .....                 | †               | 26                 | 31   | Lipson .....                    | •               | 6                  | 4    |
| Coomalpya .....                  | •               | —                  | —    | Lone Gum and Monash .....       | †               | 3                  | 8    |
| Coomawarra .....                 | †               | 11                 | 9    | Lone Pine .....                 | •               | —                  | —    |
| Coorale .....                    | •               | —                  | —    | Longwood .....                  | †               | —                  | —    |
| Coopersville .....               | 201             | —                  | —    | Lowbank .....                   | †               | 3                  | 8    |
| Coulta .....                     | •               | —                  | —    | Lorton .....                    | †               | 12                 | 10   |
| Craddock .....                   | •               | —                  | —    | Lucindale .....                 | •               | —                  | —    |
| Cungena .....                    | †               | —                  | —    | Lyndoch .....                   | †               | 2                  | 7    |
| Currency Creek .....             | †               | 8                  | 6    | McLaren Flat .....              | †               | 11                 | 9    |
| Cygnet River .....               | •               | —                  | —    | MacGillivray .....              | •               | 2                  | 7    |
| Darwin's Peak .....              | •               | —                  | —    | Mallala .....                   | •               | 15                 | 20   |
| Dudley .....                     | •               | —                  | —    | Mattee .....                    | 196             | 4                  | 2    |
| Edlillie .....                   | •               | —                  | —    | Mangalo .....                   | •               | —                  | —    |
| Elbow Hill .....                 | 199             | 9                  | 14   | Mannanarie .....                | •               | —                  | —    |



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| Branch.                    | Report on Page. | Dates of Meetings. |        | Branch.                      | Report on Page. | Dates of Meetings. |      |
|----------------------------|-----------------|--------------------|--------|------------------------------|-----------------|--------------------|------|
|                            |                 | Sept.              | Oct.   |                              |                 | Sept.              | Oct. |
| Marama .....               | †               | —                  | —      | Roberts and Verran .....     | †               | 8                  | 1    |
| Meadows .....              | †               | 3                  | 8      | Rockwood .....               | 207             | 1                  | 6    |
| Meribah .....              | 202             | 8                  | 13     | Rosedale .....               | 193             | —                  | —    |
| Milang .....               | †               | 13                 | 11     | Roseworthy .....             | †               | —                  | —    |
| Milendilla .....           | 202             | 8                  | 6      | Rosy Pine .....              | †               | 2                  | 7    |
| Millicent .....            | †               | 26                 | 31     | Rudall .....                 | †               | 5                  | 10   |
| Millicent Women's .....    | †               | —                  | —      | Saddleworth .....            | †               | 2                  | 7    |
| Miltalie .....             | 196             | 6                  | 4      | Saddleworth Women's .....    | †               | 9                  | 14   |
| Mindarie .....             | †               | 5                  | 3      | Sallsbury .....              | †               | —                  | —    |
| Modbury .....              | †               | —                  | —      | Salt Creek .....             | †               | —                  | —    |
| Monarto South .....        | †               | —                  | —      | Sandalwood .....             | †               | 6                  | 4    |
| Moonta .....               | †               | —                  | —      | Scott's Bottom .....         | †               | 2                  | 7    |
| Moorlands .....            | †               | 10                 | 8      | Shoal Bay .....              | †               | —                  | 11   |
| Moorook .....              | †               | —                  | —      | Smoky Bay .....              | †               | 12                 | 10   |
| Morchard .....             | 191             | 5                  | 3      | Snowtown .....               | 192             | 2                  | 7    |
| Morphett Vale .....        | †               | —                  | —      | South Kilkerran .....        | †               | 3                  | 1    |
| Mount Barker .....         | †               | 8                  | 8      | Spalding .....               | †               | —                  | —    |
| Mount Bryan .....          | 191             | —                  | —      | Springton .....              | †               | —                  | —    |
| Mount Compass .....        | 207             | —                  | —      | Stirling .....               | †               | —                  | —    |
| Mount Gambier .....        | 189             | 12                 | 10     | Stockport .....              | †               | —                  | —    |
| Mount Hope .....           | †               | 2                  | 7      | Strathalbyn .....            | †               | —                  | —    |
| Mount Pleasant .....       | 207             | —                  | —      | Streaky Bay .....            | 197             | 26                 | 24   |
| Mount Remarkable .....     | †               | —                  | —      | Tallem Bend .....            | †               | 11                 | 9    |
| Mount Schank .....         | †               | —                  | —      | Talla .....                  | †               | 27                 | —    |
| Mudamuckla .....           | †               | —                  | —      | Tantanoola .....             | †               | 6                  | 4    |
| Mundalla .....             | †               | 13                 | 11     | Taplan .....                 | †               | 2                  | 7    |
| Murray Bridge .....        | †               | 10                 | 15     | Taragoro .....               | 197             | 4                  | 2    |
| Murraytown .....           | 192             | 6                  | 4      | Tarowie .....                | †               | —                  | —    |
| Mypolonga .....            | †               | 24                 | 22     | Tarlee .....                 | 193             | 9                  | 14   |
| Myrla .....                | †               | 3                  | 8      | Tatara .....                 | 193             | —                  | —    |
| Nantawarra .....           | †               | 4                  | 2      | Thrington .....              | †               | —                  | —    |
| Naracoorte .....           | †               | 13                 | 11     | Tintinara .....              | †               | 27                 | 25   |
| Narridy .....              | †               | 5                  | 2      | Truro .....                  | †               | 8                  | 13   |
| Narrung .....              | †               | —                  | —      | Tulkinara .....              | †               | 11                 | 9    |
| Nelshaby .....             | †               | —                  | —      | Tweedvale .....              | †               | 11                 | 9    |
| Netherton .....            | †               | 8                  | 8      | Two Wells .....              | †               | —                  | —    |
| New Residence .....        | †               | —                  | —      | Ungarra .....                | †               | 11                 | 9    |
| North Booborowie .....     | †               | 8                  | 6      | Upper Wakefield .....        | †               | 4                  | 3    |
| Nunilkompita .....         | †               | 4                  | 2      | Ursidia and Summertown ..... | †               | —                  | —    |
| Nunkeri .....              | 203             | 8                  | 1      | Velch .....                  | †               | —                  | —    |
| O'Loughlin .....           | †               | 8                  | 13     | Virginia .....               | †               | —                  | —    |
| Ororoo .....               | †               | —                  | —      | Walkerie .....               | †               | 12                 | 10   |
| Overland Corner .....      | †               | 1                  | 7      | Wallala .....                | †               | 10                 | 8    |
| Owen .....                 | †               | 5                  | 3      | Wanbi .....                  | †               | 24                 | 22   |
| Palable .....              | †               | 5                  | 3 & 31 | Wandearah .....              | 192             | 1                  | 14   |
| Parilla .....              | 203             | —                  | —      | Warowie .....                | 189             | 9                  | 4    |
| Parilla Women's .....      | 203             | 11                 | 15     | Warrambo .....               | 198             | 2                  | 7    |
| Parilla Well .....         | †               | 30                 | 28     | Wasleys .....                | 193             | 11                 | 9    |
| Parilla Well Women's ..... | †               | 30                 | 28     | Wasleys Women's .....        | 193             | 4                  | 2    |
| Parrakie .....             | 203             | —                  | —      | Watervale .....              | †               | —                  | —    |
| Paruna .....               | 204             | 5                  | 3      | Wauralte .....               | 196             | 2                  | 7    |
| Paskeville .....           | †               | 2                  | 7      | Weavers .....                | †               | 8                  | 13   |
| Pata .....                 | †               | 5                  | 3      | Wepowie .....                | 189             | 9                  | 14   |
| Penneshaw .....            | †               | —                  | —      | White's River .....          | †               | —                  | —    |
| Penola .....               | †               | 6                  | 4      | Whyte-Yarcowie .....         | †               | —                  | —    |
| Penwortham .....           | 193             | 4                  | 7      | Willkawatt Women's .....     | 206             | —                  | 21   |
| Petersville .....          | †               | 2                  | 7      | Williamstown Women's .....   | 193             | 8                  | 1    |
| Petina .....               | †               | 27                 | 25     | Williamstown .....           | †               | —                  | —    |
| Pinbong .....              | †               | 6                  | 4      | Willowie .....               | †               | 8                  | 8    |
| Pinkawillie .....          | †               | —                  | —      | Wilmington .....             | †               | 16                 | 21   |
| Pinnaroo .....             | †               | —                  | —      | Windsor .....                | †               | —                  | —    |
| Pinnaroo Women's .....     | 204             | 5                  | 3      | Wirrabara .....              | 192             | —                  | —    |
| Poochera .....             | †               | —                  | —      | Wirrilla .....               | †               | 6                  | 4    |
| Port Elliot .....          | †               | —                  | —      | Wirrulla .....               | †               | 27                 | 25   |
| Pygery .....               | †               | 6                  | 4      | Wolsley .....                | 189             | 8                  | 13   |
| Quorn .....                | 189             | 3                  | 8      | Wudinna .....                | †               | —                  | —    |
| Rameo .....                | 206             | 8                  | 6      | Wynarka .....                | †               | —                  | —    |
| Rapid Bay .....            | 207             | 11                 | 9      | Yacka .....                  | †               | —                  | —    |
| Redhill .....              | 192             | —                  | —      | Yadnarie .....               | 201             | 2                  | 7    |
| Rendelsham .....           | †               | 2                  | 7      | Yallunda Flat .....          | †               | —                  | —    |
| Renmark .....              | †               | —                  | —      | Yandiah .....                | †               | —                  | —    |
| Rhynie .....               | †               | —                  | —      | Yaninee .....                | †               | —                  | —    |
| Richman's Creek .....      | †               | 4                  | 2      | Yantanable .....             | †               | —                  | —    |
| Riverton .....             | †               | 8                  | 13     | Yeelanna .....               | 201             | 3                  | 8    |
| Riverton Women's .....     | †               | —                  | —      | Yorketown-Melville .....     | †               | —                  | —    |
|                            |                 |                    |        | Younghusband .....           | †               | —                  | —    |
|                            |                 |                    |        | Yurgo .....                  | 206             | —                  | —    |

\* No report received during the month of August.

† Formal.

‡ Held over.

R In recess.

A.M. Annual meeting.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

**MOUNT GAMBIER** (Average annual rainfall, 30.82in.).

Meeting held June 13th. Present: 14 members. Mr. G. Gurry read an interesting paper, in which he gave an outline of the early history of the Mount Gambier Branch of the Agricultural Bureau.

**WOLSELEY** (Average annual rainfall, 18.36in.).

June 9th.—Present: 31 members.

**TRACTOR VERSUS HORSES.**—Mr. S. J. Baker read the following paper:—"First it is necessary to purchase a good, reliable make of tractor, which will cost approximately £500. The life of the tractor will depend on how it is looked after. If the manufacturer's instructions are followed a tractor should give seven to ten years of general farm work. After having worked the tractor for two years have the engine overhauled once each year. For the soil in this district one requires a tractor that will do at least a 10-horse job, and one that will work 24 hours a day when necessary. The cost of 10 horses, harness, stable, and feed for the first year would cost as much as a tractor and fuel for the first year. Tractor and fuel for the first year, £650. Horses:—10 at £30 each, £300; harness, £8 per horse, £80; feed, £20 per horse, £200; chaff, shed and stables for 10 horses, £100; total, £680. The tractor would be much quicker than the 10 horses, and time is worth considering. With tractor farming one would not require to employ so much labor as farming with horses. Ten horses would require approximately 50 acres for grazing per year. With a tractor this 50 acres could be cropped and show a good return. The attention that a tractor in working order requires would not be more than half an hour a day. With horses it is necessary to get up early to feed and groom; this is wasted time. When the ground is suitable for horses to work on it is suitable for a tractor, and, done with a tractor, has a better appearance, and there is not so much waste time. The tractor will not tire from heavy working. When a horse breaks down it must have a spell, and therefore a spare horse or two has to be kept on the farm. With a tractor small mishaps can be fixed up in very short time, and not much knowledge is required. When the day's work is finished a tractor is ready for duty the next morning, and does not want feeding."

**HORSES VERSUS TRACTOR.**—Mr. S. Snoad read the following paper:—"It is easier to start farming with horses than with a tractor, because of the difficulty of obtaining finance. Whilst horse-power is slow, it is steady, and there is not so much likelihood of breakdowns. There are farmers in this district who owned tractors, yet they work horses, and leave the tractor in the shed. A horse farmer can maintain his team by rearing one or two foals each year, and so keep the team young and active. The life of a tractor is only about five years. To obtain the best results from a tractor the machine should be worked by the same man the whole time. Probably the lack of experience in tractor drivers is one of the greatest obstacles at present in the way of successful power farmers. The person in charge of the engine should realise that a very delicate piece of mechanism has been placed in his hands, and that skill and attention are needed constantly if best results are to be obtained from the tractor. A team driver does not need any mechanical knowledge to manage and drive horses. The work of a team of horses is done silently and without the continual vibration which eventually affects the nerves of the operator of the tractor. A farmer can do the work much cheaper by having a good grass paddock for his horses for working the fallow. I worked 140 acres three times on one feed a day. The horses were got in in the morning from the paddock and worked until dinner time, and then turned out again in the paddock at night. They were in fat condition the whole time."

**HORSES VERSUS TRACTOR.**—The following paper, putting the claim for horse as being the most efficient and economic worker on the farm was contributed by Mr. E. Sharrad, who proposed to deal with farms of no more than 700 acres:—"This farm cannot be more efficiently worked with a tractor than with horses. In the Tatiara, in a normal



year, one has to do a certain amount of fallowing when the crabholes are full of water. The horses will do this job, as well as the hundred and one small jobs on a farm which require a horse. The horse has helped to buy most of the tractors on the farms. I have worked both the tractor and horses, and would rather drive the horses. The latter is a cleaner, warmer, and a quieter job. If one horse is sick it can be replaced at very little cost; one can perhaps borrow from a neighbor who has a few idle horses. If the same trouble persists in a tractor it is impossible to borrow another tractor, and one may possibly be hung up for a week or two in seeding or harvest, waiting for repairs. Most writers, when comparing the relative values of the horse and tractor, put too high a price on the horse. A half-draught horse can be bought for £10 or £15, which will do the work, and do it well. There is no necessity to pay high prices for horses. A young farmer starting on a farm on his own can aim at getting a good team by gradually raising the class of his team by breeding. Two good mares will breed up a team in a few years, and by always breeding a couple of foals every year it will not be necessary to pay high prices to fill up the gaps in the team, occasioned by old age and the loss of a horse. The cost of keeping a foal is very light until it is ready to break in. After paying for the service of a good sire, there is practically no expense until it is time to break in the foal, and then only at a cost of about £3 10s. for harness, which, if carefully looked after, will last for 20 years. The heavy initial cost of the tractor gives the farmer a good deal of worry wondering if he is going to pay for it. The tractor is a continual drain on the finances of the farmer for grease, benzine, and kerosene all through seeding and harvest. Money is sent out of the Commonwealth for the tractors and all that propels them comes from overseas. The horse and all its harness are products of Australia. It should be the aim of all farmers to build up the Commonwealth by using horses, thereby effecting a saving of money."

**TRACTOR VERSUS HORSES.**—Mr. A. Grosser read the following paper:—"The tractor has its advantages and disadvantages. If farmers would realise that the power of a tractor is limited to pull a certain load it would give far better results. The life of a tractor depends on the treatment it receives. One does not hear of a farmer going out with an eight-horse team and pulling two ploughs with it; yet this is not uncommon with the tractor. The most important point to watch is the oiling. Also water and grease the cups, and keep all bolts tight. The tractor is able to take the place of an engine for cutting chaff, and can be used to assist in putting in and taking off the crop at a critical stage. Horses have to be given a spell, but the tractor, with proper care, will work continuously. It can also be used for pulling trees and pumping water. The tractor is worthy of a place on the farm. Those in the past who were not in favor of tractors have one to-day."

**HORSES VERSUS TRACTOR.**—"There is no doubt that the tractor has its good points, but, from my experience, horses are the best all-round form of farm power," said Mr. H. W. Orton, in a paper on this subject. "Australia produces its own horse-power, and by using this power we are helping ourselves. The tractor is made overseas, the fuel is imported, and the money goes to other countries. It is argued that the tractor will sow twice as much area as a team of horses. This is possibly true, if everything goes well; but in the case of a breakdown with the tractor it will mean perhaps the loss of a week before the part is replaced. If a horse becomes sick, at a pinch it is possible to carry on with one less, but generally there is a spare horse on the farm that can be used until the sick one recovers. If at fallowing the ground becomes wet and the crabholes boggy, the horses are able to get along, but the tractor bogs and makes a poor job of fallowing. At harvest it does not pay to work the tractor half-loaded, and the average-type is not more than half-loaded when pulling a harvesting machine. This is waste of fuel. It requires two men to operate a tractor and stripper; one can drive a team of horses and work a stripper, and there is no danger of fire with horses. When carting wheat horses load the wagon with the bag-lifter, which would be a very tiresome job for the tractor. The feed which the horses eat for the year does not cost the farmer a great deal to produce, but fuel which the tractor uses requires money to procure. Tractor driving is a strain on the nerves, but it is a pleasure to drive a team of good horses."

## UPPER-NORTH DISTRICT.

### (PETERBOROUGH AND NORTHWARD.)

**BLACK ROCK** (Average annual rainfall, 12.57in.).

On June 17th a debate, "Horses v. Tractor," was held between teams from the Morchard and Black Rock Branches. The Morchard Branch, which debated in favor of the tractor, was adjudged the winners.



**MORCHARD** (Average annual rainfall, 13.50in.).

At the June meeting of the Branch Mr. P. Schultz read a paper, "Domestic and Farm Animals." The annual report was read, and officers elected for the ensuing year.

**QUORN** (Average annual rainfall 13.60in.).

Mr. L. Eckert gave an address, "Misplaced Methods of Farming in the North," at the meeting held on June 11th, which was attended by eight members.

**WARCOWIE** (Average annual rainfall, 12.16in.).

June 10th.—Present: Nine members and four visitors.

**HINTS ON SOLDERING.**—Mr. A. Crossman read the following paper:—"A knowledge of soldering will often prove useful on the farm. Two irons are needed—a heavy one weighing about 1lb., and a lighter one for fine work. Use good solder. A brush for applying spirits of salts can be made with a piece of tin and horse hair. For new and clean galvanized iron the spirits can be diluted with water, but where the material to be soldered is dirty, use raw spirits, leave it for a few minutes, and then rub off with a rag. Do this until the material is clean. Although sometimes this will not bring everything off, the dirt can be scraped off with a piece of an old wire rope a few inches long. Tightly fasten a piece of tie wire near the ends and rub with the ends. The fine wire will find its way into small cracks. Sal ammoniac is used for tinning the iron. When the iron is fairly hot, rub the point with an old file to clean it, then rub on the sal ammoniac, melt a little solder on it, turn the iron in this, and no trouble will be experienced in tinning, providing it is clean and smooth. Have the iron hot enough to melt the solder quickly, but do not get it red hot or the tin will be burnt off. When making a joint, see that the solder is sweated in between both pieces, and watch for air bubbles. In soldering brass, I find that resin or soldering preparation is much better than spirits of salts."

**WEPOWIE** (Average annual rainfall, 13in. to 14in.).

Mr. T. Orrock presided over an attendance of nine members and visitors at the meeting held on June 30th, when a paper, "Buy Australia Made Goods," was contributed by Mr. E. Roocke.

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## MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

**BOOLEROO CENTRE** (Average annual rainfall, 15.41in.).

Mr. E. L. Orchard (District Agricultural Instructor) delivered an address, "Fallowing and Wheat Varieties," at the meeting held on June 17th, which was attended by six members.

**KOOLUNGA** (Average annual rainfall, 15.61in.).

Meeting held July 1st. Present: 14 members. Mr. Campbell, of the Royal Automobile Association, delivered an address.

**KOONUNGA.**

A paper, "Oil and Some of Its Uses," was read by Mr. G. Cartwright at the meeting held on March 11th, which was attended by 24 members.

Twenty-two members attended the meeting held on April 8th, when a paper, "Pig Raising," was contributed by Mr. A. Tschärke.

At the meeting held on May 13th Mr. W. Mickan gave a demonstration of soldering. Twenty-one members attended.

**KOONUNGA.**

Meeting held June 10th. Present: Mr. R. Tschärke (Chair) and 30 members. Mr. W. Mickan delivered an address, "The Lack of Co-operation between the Farmer and the Blacksmith." An interesting discussion followed.

**MOUNT BRYAN** (Average annual rainfall, 16.87in.).

Meeting held June 14th. Present: Eight members. The meeting took the form of a Question Box. A number of interesting questions were asked and discussed.



## MURRAYTOWN.

Meeting held June 7th. Present: Mr. F. Bleischke (Chair) and 14 members. Mr. E. L. Orchard (District Agricultural Instructor) gave an address, "Fallowing."

REDHILL (Average annual rainfall, 17.02in.).

Meeting held June 10th. Mr. T. Simmonds presided over an attendance of nine members. Mr. S. Crouch read a paper, "The Care and Management of the Farm Horse," and a good discussion followed.

SNOWTOWN (Average annual rainfall, 15.78in.).

There was a large attendance of members at the meeting held on June 13th, when Mr. C. Crewe, of the Vacuum Oil Co., gave a cinema lecture entitled "Lubrication."

## WANDEARAH.

Meeting held June 10th. Present: 21 members. Mr. L. Crouch delivered a short address, "Points in Successful Wheat Growing." Members submitted questions, and several discussions took place. Items from the *Journal of Agriculture* were read and discussed.

WIRABARA (Average annual rainfall, 19.47in.).

April 10th.—Present: 17 members.

KEEPING A FARM DIARY.—Mr. A. Curtis read the following paper:—"This paper is written with the idea of pointing out the value of continual record of activities during seasonal work. One is prone to think that no records are needed as, for instance, the day seeding is started, but if one had records of the dates, say, for a period of 15 years on which seeding was started, together with the results, it would probably help one to come to a decision as to whether it would be advisable to go on or not during some abnormal season. Many farmers have no doubt read with interest various articles that appear from time to time in the *Journal of Agriculture* on "Crop Rotation" or some kindred subject, but could individual farmers write down in correct order the rotation in which the paddocks have been cropped and which crops—wheat, barley, oats, &c.—bare fallow, grass or stubble, quantity of super used, name of wheats, rainfall, &c., that have been sown on the paddocks. If these details are lacking, how is it possible to draw correct conclusions from any rotation of crops that may be attempted. Even if entries are made only at regular intervals of a week or month it would be of great service. After a copy is full, a year's remarks in brief can be appended. There is usually a page for this purpose at each end of a volume. The blotters in the diary are very useful, the book is a good calendar, and contains useful information to the user. To no one should the keeping of a diary be of more service than to farmers and other primary producers."

THE ARTESIAN BASINS.—A paper of this subject was read by Mr. H. Hunt at a meeting held on May 8th:—"The Continent of Australia is like a saucer in shape. It is high round the coast, and hollow in the middle. The water which falls in the high lands near the coast soaks down into the layers of rock which form the earth's crust. These layers are of two qualities, the impervious hard rock, and the pervious, soft sandstone rock. Often, as in the case of the Great Australian Basins, the soft rock is underneath a layer of hard rock, so that until a bore is sunk through the hard layer the water cannot come to the surface. When the water does come to the surface it comes with great force, and often shoots up high in the air. In the Great Australian Basin these layers of rock are curved downward in the centre, their outcrops being in the high lands on the east coast of Australia, which is the intake, and near the railway where the water rises to the surface and is evaporated, leaving mounds of mineral with water on their summit in a basin. Some of these mounds are 60ft. in height. Bores are, of course, sunk between these outcrops. The depth of the bore depends largely on its position in the basin. Near the outcrops 50ft. may be sufficient, but the bore at Blackall, near the centre of the basin, is 7,000ft. deep. The yield from one bore for 24 hours has been known to reach 3,000,000galls. There are 1,300 bores in the Great Basin, 50 of which are in South Australia. Water from deep bores is hot and highly mineralised, fit only for stock, except in rare instances where it has been found to be suitable for irrigation. The flow from many of the bores is decreasing, and measures for controlling the water have been taken. The main vegetation in this area is drought-resisting plants, such as salt bush and blue bush, although in many parts grass grows. There are three fairly large ones in Western Australia, one around Eucla, and a large one in the Murray Basin. There are several small ones in South Australia, including one in the Orroroo district."



## LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

### BLACK SPRINGS.

Mr. W. J. Spafford (Deputy Director of Agriculture) delivered an address, "General Farming Practices," at the meeting held on June 12th, which was attended by 16 members.

### BROWNLOW.

Meeting held June 25th. Present: 18 members and visitors. Mr. S. B. Opie (Field Officer of the Department of Agriculture) delivered an address, "The Value of Experimental Work."

### LIGHT'S PASS.

Meeting held June 16th. Present: 33 members. Mr. W. Sharp gave an interesting lecture, "The Early History and Colonisation of South Australia."

### PENWORTHAM.

The Annual Meeting was held at Sevenhills on June 19th, and was attended by 20 members. The annual report was read, and officers elected.

### ROSEDALE.

Nineteen members and visitors attended the meeting held on June 17th, when Mr. J. Ruediger delivered an address, "Pruning Fruit Trees and Vines."

### ROSEWORTHY (Average annual rainfall, 17.46in.).

There was a large attendance of members and visitors at the meeting held on June 5th, which took the form of a debate on the subject, "Open Marketing v. Pooling Wheat." Open marketing was debated by Messrs. E. Rice and P. Maloney, whilst the claims of the pool were supported by Messrs. E. Oates and J. Dridan. Members were present from the Gawler, Wasleys, and Mallala Branches.

### TARLEE (Average annual rainfall, 18.16in.).

At the meeting held on May 13th, the Chief Dairy Instructor (Mr. H. B. Barlow) delivered an address, "The Dairy Industry Act." Seven members and four visitors attended.

### WASLEYS.

Fifty-two members and four visitors attended the meeting held on June 20th. Mr. R. Baker, R.D.A. (Dairy Instructor at Roseworthy Agricultural College) delivered an address, "The Care and Management of the Farm Cow."

### WASLEYS WOMEN'S.

Mrs. F. Wait presided over an attendance of 41 members at the meeting held on June 5th. The following papers were read and discussed:—"Bacon Curing on the Farm," Mrs. F. Napper; "Cake Making," Mrs. Carey; "Making Small Cakes and Biscuits," Miss I. Sires. Samples of cakes, &c., were tabled by the readers of the papers.

### WILLIAMSTOWN WOMEN'S (Average annual rainfall, 27.84in.).

Meeting held July 2nd. Present: Eight members. The Annual Report was presented and officers elected for the ensuing year.

## YORKE PENINSULA DISTRICT.

### (TO BUTE.)

### THRINGTON.

June 5th.—Present: 28 members and four visitors.

Mr. M. Yelland read a paper, "Side Lines on the Farm":—South Australia was principally an agricultural State, wheat being regarded as its chief asset, but there was no reason why it should not be self-supporting in other essential products which were termed side lines. The last year or two had made the farmer realise what a stand-by they were to wheat-growing. Every farm should have side lines, but the extent to which they could be worked depends on the size of the farm and how the farmer was situated. The man with a grown family was better able to run side lines than a man who was a bachelor or who had only his wife to assist him. The main thing with side lines was



to provide proper housing and accommodation for all stock; that was half the battle, and without it there was little chance of success or profit. The most profitable side line in the district was sheep. Besides the financial return, sheep were a valuable asset in keeping the fallow clean, and they also packed and consolidated the seed-bed for the coming crop. By buying and selling sheep one might receive good returns, but one was liable to become overstocked, and if the market fell they would have to be carried on, which would restrict fallowing operations and result in lower crop yields the following year. On the average farm in the district it paid better to keep a permanent flock of from 150 to 200 large-framed Merino ewes, keeping only enough wethers for killing purposes. The Merino ewes could be crossed with some ram suitable for breeding fat lambs, such as the Shropshire, Dorset Horn, Leicester, Lincoln, or the Corriedale. He favored the Corriedale because the wool was of better quality and the lambs were good for mutton. The ram should be mated early in November and the lambs would arrive in April in the warm weather, which would be much better for the young lambs. While the ewes were lambing they should be looked at every day or two, especially if flies were bad, and should always have plenty of feed and water. With good luck, with 150 ewes one ought to get about 120 lambs. Besides the lambs, one would have the wool from the 150 ewes. At shearing time one should cull out any that were poor-wooled or were fencers. They could be killed off. With sheep on the farm, meat was always procurable for about half the price it could be bought from the butcher. Pigs were profitable, especially since the price of barley was low. Some farmers bought two or three suckers and reared them and then sold and re-stocked again, while others kept four or five breeding sows and a hog. Regarding breed, it was just as costly to feed a good animal as a mongrel; they ate just as much feed, but there was not nearly the same profit. The Mid-York cross was very good, or Berkshire or Mid-York sows crossed with the Tamworth; and again, Berkshire or Mid-York crossed with the Large White York. That was the pig advocated at present for a bacon pig, and was strongly recommended by the Victorian Better Farning Train. The Tamworth-Berkshire made a fine bacon pig, or again, a three-quarter Tamworth mated to a Berkshire hog, or *vice versa*. There should be three or four sties—one kept for the hog and the others for the sows. It was a good thing to have about an acre or two pig-netted and sown with barley. The pigs would graze on it in the winter, and it would form the bulk of their food, especially sows that had been mated, which should always have plenty of water, and in the summer time should have a wallow with plenty of water in it. Barley was about the best feed for pigs. For best results it should be crushed; if not crushed it should be well soaked or boiled, otherwise the pigs did not obtain the full benefit from it. Each sow should have two litters a year of from eight to ten pigs; some had more. Calculated at £1 per head, they would be very profitable. The sow should be put in a sty to herself about a week before farrowing, and kept fairly quiet. The sty should have a railing around it, so the little pigs could get out of the mother's way. Straw should never be put in with a sow before farrowing, but always a little chaff or something not too bulky, because when the pigs were born they were either suffocated in the straw or the sow lied on them. Straw could be put in after about a fortnight. If one was about when the sow farrowed, it was advisable to take the pigs and put them in a box lined with bag and keep them warm until they were all dry, and then put them back with the sow and see that she suckled them. A sow should not be fed much for about 24 hours after farrowing. After that she could be fed regularly. After about a fortnight the little ones would drink a little pollard and milk, mixed thin, in a small trough. At about three weeks to a month all pigs should be doctored. The knife should be clean, and salt water applied to the wound after doctoring. When done, the young pigs should be put into a clean sty with a concrete floor. If they got dirt into the wound they would be liable to get tetanus. When the pigs were six weeks old they should be weaned and would be fit for sale. Lice could be kept off the pigs by using tractor drainings and kerosine or sheep spray for blowflies. The fowl on the average farm did not receive much attention with the exception of a little wheat now and again and a tree to roost in. Most of them were of the barndoor variety. The first step with fowls was to house them in good houses, which should be anything from 12ft. to 15ft. deep, with a vent at the back for draught, and should have netting around them and doors so that fowls could be shut up at night against foxes, dogs, cats, &c. Tick was one of the bugbears of poultry-raising, but could be controlled by tick-proof perches and weekly applications of sump oil and kerosine on perches and all woodwork. Nests should be made out of tins, and should have beach sand or chaff put in them. He favored the White Leghorn or the Minorca for egg laying. Orpingtons were very good, and the Rhode Island Red made a good table bird. Fowls should always have plenty of shell grit and charcoal, and also plenty of green food. Greenfeed was one of the most important things with fowls. Lucerne was the best, and could be easily grown where one had plenty of water. For feeding fowls, he favored crushed barley mixed with bran. A good mash was two parts of crushed barley and one part bran, with plenty of chopped up



lucerne, or barley fed whole was very good. If fed properly fowls should return about £1 a hundred per week profit. All eggs should be gathered at least once a day. Roosters should not be allowed to run with the hens that were laying for market. If farmers generally were more particular with farm eggs they would receive a better price all through the year. He favored the incubator for breeding chicks. About the 120 size was convenient on a farm. All eggs should be not over a week old for incubation. Care should be taken with the incubator with regard to the temperature moisture and to see that it was level and to run it in a suitable position without draughts. When the chickens were taken from the incubator they should be put into a brooder. Suitable houses for brooding should be made, with wire-netting runs outside for use on sunny days. Chicks should not be fed for 48 hours, and then fed on cracked grain, with plenty of green food and water. When they were about six weeks old they should be put in cold brooders and not overcrowded. When old enough, pullets should be separated from the cockerels, and the latter fed up and sent to market as soon as possible. Each year's rearing should be marked by a ring on the leg. In that way one would be able to cull

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the flock. After a hen had finished her third laying season she should be fattened and sold. The best way even on a farm was to keep fowls on the intensive system, keeping them shut up and fed properly. They would produce more eggs, especially during the winter months. Drinking vessels should be kept clean and houses cleaned out or the fowls would get roup. Epsom salts put in the drinking water once a week, and also Condy's crystals, would help to combat disease. The best time of the year to hatch the heavy varieties was July to August, and the light varieties from August until October. Autumn hatched chicks thrived well if they had plenty of green feed. Geese and turkeys on the farm were profitable, especially about a dozen young gobblers. Geese were very easily reared and picked up the bulk of their food, but they were very destructive. Turkeys were fairly difficult to rear, and they needed plenty of green feed. A hen was better to rear turkeys than a turkey hen, because the hen did not wander as a turkey did. Young turkeys should be fed on rolled oats for the first three or four days and then fed on bran and pollard mixed with warm milk to make it crumbly. Plenty of green feed and onion tops were also very good. Cows on the farm were all right if one had a family to do the work. Every farm should have one or two cows for home use, and one could then sell a little butter. Cows were a lot of work and were a big tie for the women on the farm. The best milking cow was the Jersey or the Friesian. In our district it was necessary to use so much dry feed for cows they did not get the results they would if there was green feed available practically all the year round. A big advantage of having two or three cows on the farm was the separator milk, which was of great value to young pigs. A good discussion followed.

#### WEAVERS (Average annual rainfall, 17.03in.).

June 8th.—Present: 17 members.

The evening took the form of a Question Box. Mr. L. Arthur asked, "Is it necessary to pickle barley when sowing under dry conditions?" Mr. Piggott considered pickling necessary if the seed was smutty. Mr. Slade said it was safe to sow grain dry if there was smut present, but as a preventive he advised using  $\frac{1}{2}$  per cent. solution of formalin. Mr. W. Anderson said it was safer to pickle barley under present marketing conditions. Mr. G. Tarrant asked the best method to adopt when breaking in young horses? Mr. L. Arthur thought the more handling the colt was given the better. Mr. Piggott advised putting on the halter with the bit in the horse's mouth, and allowing the colt its freedom to harden the mouth. The Hon. Secretary (Mr. H. Cornish) read the Annual Report, and officers were elected.

### WESTERN DISTRICT.

#### CLEVE (Average annual rainfall, 14.63in.).

The annual meeting of the Branch was held on July 2nd, there being present 10 members. The Annual Report was read, and officers elected for the forthcoming year.

#### ELBOW HILL (Average annual rainfall, 11in. to 12in.).

Meeting held June 11th. Present: 11 members and four visitors. Mr. H. D. Adams (District Agricultural Instructor) delivered an address, "Soils and their Management."

#### GOODE WOMEN'S (Average annual rainfall, 10.20in.).

Meeting held June 12th. Present: 13 members and 11 visitors. Dr. C. Hallett, M.B., B.V.Sc., delivered an instructive address in which he dealt with the subjects, "Anti-Natal Care" and "Child Welfare."

#### MALTEE.

Meeting held June 12th. Present: Mr. J. Bassham (Chairman), nine members, and three visitors. After formal business, the holding of a local Crop Competition was discussed, and it was decided to limit entries to Branch members only. Mr. Miller offered a shield to be competed for and the winner's name to be added each year. Mr. Schwarz exhibited a novel shoot-cutter made from an old disc drill.

#### MILTALIE (Average annual rainfall, 13.89in.).

Meeting held June 7th at the residence of Mr. J. Story. Present: 16 members and five visitors. An instructive paper, "The Value of the Primary Producer to Australia," was read by Mr. G. Partridge.



**STREAKY BAY** (Average annual rainfall, 14.95in.).

The meeting of May 25th was devoted to a discussion on matters of local interest. Five members attended.

On June 21st Mr. W. Johnston (Agricultural Instructor for the Lower North) addressed the meeting.

A large number of visitors and delegates attended the July meeting, when a lecture and demonstration was given by a representative of the Vacuum Oil Company.

**TARAGORO.**

June 12th.—Present: 13 members.

**POWER FARMING.**—Mr. S. Simmons read the following paper:—The increased efficiency that has resulted from the spread of improved machinery and larger power units, and the wider application of improved practices will be a strong influence in restoring agricultural prosperity in South Australia. Machinery, such as we have at our disposal at the present time, is causing a revolution in agriculture. What its results will be it is impossible to state, but it is evident that in the very near future definite changes are inevitable. The tractor is one of the most modern machines that has been introduced to agriculture of recent years. Production in quantity and labor-saving devices are what are needed to-day in agriculture, as well as in other industries. To do this, modern methods of working the farm must be adopted to ascertain which is most profitable. I consider the tractor the most efficient power for farm work, providing it is given proper attention. The progress that has been made in the quality, performance, and usefulness of the tractor in the last few years has been very rapid. It is a mistake to expect a tractor which is rated at 10 or 12 horse power to do the work or operate a load that it would take 14 horses to pull, and this is what occurs in many cases; overloading the tractor is the worst abuse to which it can be subjected. A "horse-power" as used by mechanics and engineers is a measurement of the rate of doing work—it is not merely a measurement but a force, exerted through a distance, and the time during which such force is exerted. It may be that a tractor is pulling the same load as is pulled by five horses, but that does not mean that the tractor is not developing more power than the horses. The speed at which the load is pulled must be considered in order to compare the relative amount of power developed. If the horses pull the load two miles an hour and the tractor pulls it four miles an hour, the tractor is developing twice as much power as the horses and doing twice as much work. That is why a tractor rated at 10 horsepower on the drawbar and only pulling a load equivalent to five horses is developing its full rating of 10 horsepower. A horsepower is a fixed unit which does not vary. There are many and varied branches of work which a tractor can do. It does belt work as well as field work. It requires no care when idle, it is not affected by heat or cold, needs no rest, is unfeeling under neglect and hard work, and does faster work. That is where the tractor has an advantage over the horses. Time is a very important factor on the farm, and time saved is time gained. Not only does it enable the farmer to do his work much faster, but he is also able to take advantage of weather conditions. A tractor can be worked both by day and night if so desired. Providing it has the three essentials—fuel, oil, and water—the tractor will work indefinitely. This cannot be accomplished with animal power; muscles must have a rest. An animal body, be it man or horse, is capable of developing a certain amount of energy only every 24

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hours. Muscles cannot produce power continuously for more than a few hours at a time; they must have rest to allow them to recuperate. On the other hand, an engine such as is built in the tractor of to-day is capable of delivering its full rated power not only hour after hour, but week in and week out. The owner will be confronted with minor troubles and mishaps, but after a person becomes conversant with the mechanism of the engine these will be speedily put right. Where a tractor can be used on a farm it will prove to be an asset, by enabling the farmer to keep abreast of the times, and will encourage better and more modern methods of working the farms." Discussing the paper, Mr. J. Crooks thought the tractor in conjunction with horses was a good combination where feed was grown on the farm, the tractor to do the heavy work and horses the light work. Mr. E. Retallick said a farmer should consider the cheapest method for working. He preferred horses when established, but advocated the tractor for a new block. Mr. T. Winters thought power farming too expensive, and favored horses worked in conjunction with a tractor. Mr. I. Guy preferred six horses as well as tractor; the horse team could do drilling and follow the tractor. Recently with his tractor and a 14-tine cultivator working day and night he had completed 330 acres in a week. Mr. A. Edwards said the tractor was not as cheap or reliable as horses. Horses worked in conjunction with the tractor was an ideal combination. Mr. T. Winters said provided the farm was suitable for a tractor and careful attention paid to maintenance and using suitable implements, the tractor would prove an asset. By rushing in the crop at the most suitable time the returns would compensate the working costs. The price of fuel and lack of efficient service stations in country districts were very serious drawbacks to tractor owners. Tractor farming, despite those drawbacks, had many advantages which could not be overlooked. The life of a tractor depended on the class of country on which it worked and its driver.

#### WARRAMBOO.

May 13th.—Present: 30 members and four visitors.

**FALLOWING.**—Mr. O. J. Murphy read the following paper:—"Various systems of farming have been adopted with the object of producing heavy crops and of maintaining and increasing the fertility of the soil. In certain districts of this State, where the average rainfall is not less than 20ins., successful results are being obtained by a crop rotation in which the growing of peas is an important factor. But in respect to the greater part of the Australian wheatgrowing areas, the practice of bare fallowing has been found to be the most effective system in the production of food crops. Fallowing means that for a period of approximately one year, part of the soil is lying practically idle. We must ask ourselves, therefore, why this practice is adopted, and how it tends to maintain the fertility of the soil. It has been proved that a crop of peas obtains a considerable amount of its nourishment from the air in the form of nitrogen, and stores it in the soil. The succeeding crop of wheat benefits by this process, termed the nitrification of the soil. Any system of farming which does not provide for the maintenance of the fertility of the soil must fail ultimately. In what way does fallowing bring about the nitrification of the soil, and the maintaining of a high state of fertility? In answer to these questions it may be said that no other system in Australia has been so productive of good results as the practice of fallowing. The main objects of fallowing are the conservation of moisture, the aeration of the soil, and the production of those special conditions which are distinctly favorable to the vigorous growth of the wheat plant. It has been shown that the conservation of moisture is by no means the only important factor. Agricultural scientists inform us that there is a tremendous amount of bacterial action in the soil which has an important bearing on the fertility of the soil. When we fallow land and use good cultivation methods at the right time we provide conditions which are favorable to great bacterial activity. The average farmer may not understand the action of soil bacteria, but scientists tell us that the results of bacterial action in the soil is practically the same as the results which follow the growing of a pea crop. Any system of cultivation which will stimulate bacterial action means greater fertility of the soil, and correspondingly greater crops. Both moisture and heat are necessary for rapid bacterial action, but it should be again emphasised that the moisture content of the soil is not the only important point. Dr. Richardson has stated that 3½bush. of wheat per acre may be grown under favorable conditions for every inch of rain which falls during the growing period of the wheat plant. This fact has been demonstrated on South Australian farms within recent years, but the fact that the average crop falls very far below this standard indicates that moisture alone is not, perhaps, so important as we were inclined to think. We must have other conditions favorable to the wheat plant's growth, and fallowing helps to provide these conditions. In regard to the question of fallowing on the West



Coast, and in our district in particular, there appears to be sound reasons for the adoption of a regular system of fallowing. Our average rainfall and the conditions which obtain in new mallee areas do not warrant the testing of a rotation of crops in which peas may be grown; but if we fallow our land, we can in the first place conserve moisture. We can all recall seasons when the prospects for a good harvest were excellent until a dry spell in the spring months occurred. The weather conditions of the spring apply the acid test to our crops, and the best safeguard against a crop failure at that time of the year is a well-prepared fallow. *Methods of Fallowing.*—The writer advocates the use of a rigid tyne cultivator or skim mouldboard plough for the initial stirring of the soil, with a preference for the cultivator on comparatively new lands. A cultivator with wide tynes, good clearance, and lever to adjust draught while working, specially designed for use in the mallee areas can now be obtained. It does excellent work, and covers more ground per horse than the plough. The work should be shallow, not more than 3in. in depth. Long experience goes to show that the wheat plant thrives best on a shallow, well-compacted seedbed covered by a loose mulch 2ins. or so in depth. Fallowing should be commenced as soon as possible after seeding. Rain is one of the best agents in compacting the soil. Early fallowing has, therefore, two great advantages over late fallow in respect to conservation of moisture and the compacting of the seedbed. Most of the land in this district may be described as fine-textured sand rises, and heavier, red, loamy flats. If the sand rises can be worked when the soil is wet, so much the better. Subsequent working of the fallow will depend on seasonal conditions. It should always be borne in mind that the value of fallow depends not so much on the amount of cultivation as on the time at which the work is carried out. The growth of weeds may be kept in check by sheep. If these are not available, cultivation should be done with the rigid-tyne cultivator before weeds have seeded, and preferably after a rain. Harrows may be used on the heavier soils with advantage, but should not be used on sand rises. The latter should not be worked in a dry condition on account of the drift menace. Drift takes place readily on a smooth, level surface. In the event of heavy rain, such as the 24in. which fell in December last, the surface of the fallow may be washed over. Immediate working of the fallow after summer rain of this character will check the tendency to drift, caused by the smoothing action of the rain, and will also prevent rapid evaporation of moisture from the seedbed. Moisture rises to the surface by capillary action, in the same way that moisture rises through the bark of the tree. If we could cover our soil with corky chaff or stable manure immediately after a rain, we know from experience that we could retain a large percentage of the moisture, but as that method is not practicable, we use the cultivator or the harrows. The working of the surface of the fallow after rain makes a break in the capillary action of the moisture, and although the cultivation may result in the more rapid evaporation of moisture from the immediate surface, we form a mulch which prevents rapid evaporation from the seedbed. Sandy soils are self mulching, and although action is not necessary to produce a fine mulch, it should be carried out more with the idea of preventing drift. Hence the great importance of cultivation after rain. Apart from the question of conserving moisture, forming a seedbed, and working the fallow with discrimination, there are other important points in favor of fallow in new areas. It is the aim of every mallee farmer to free his land from mallee shoots and stumps. It is practically impossible to make a thorough job of seeding operations if we leave the whole of the cultivation until seeding. In fact, the amount of work involved in ploughing or cultivating at seeding time, removing stumps pulled out, drilling and harrowing, is so great that less thorough methods are frequently resorted to in order to crop a big area. Fallowing enables the farmer to spread the work throughout the year—it will result in more stumps being removed from the soil; the prospects of a good stubble burn so necessary in eradicating the mallee shoot will be considerably enhanced, and as a consequence, the period of reclaiming the soil from the mallee will be appreciably shortened. Moreover, the farmer who has land fallowed can afford to choose the most favorable part of the season in which to sow the land. Any attempt to sow a large area at seeding time not previously prepared must result in at least a portion of the crop being sown very early or very late. The very early sown crop is more liable to damage by drift. The crop grown on fallow will show the effect of a heavy application of super; it will be a very poor year in which the crop on fallow will not pay expenses. In respect of the question of fallowing virgin land, there is not sufficient evidence to show whether this practice would be payable, but the new settler would be well advised to start a fallowing system in the second year of his block. Five hundred acres of land yielding 12bush. to the acre will not give any more bags of wheat than 1,000 acres yielding a 6bush. average, but the former is a very much better proportion from an economic point of view. Once adopted, the practice of fallowing will soon induce the farmer to aim at average, rather than area." *Fallowing.*—Mr. W. Norris read the following paper:—"One of the most



important roads to success on the farm is fallow. According to statistics, wheat reaped off fallow in 1928-29 yielded an average of 12bush. per acre, while wheat off land not fallowed averaged 6bush. per acre. When fallowing, it should be seen that the plough is kept in good order, thus turning over the furrows evenly and cutting all the ground between the furrows. The shares should be kept sharp, never allowing the bodies to rise. Fallowing should be commenced in June, and finished no later than the 20th August. Late fallow has a tendency to create take-all; the depth of the fallowing should vary according to the nature of the soil. I will divide the land into three classes—heavy, medium, and light. Heavy soil should be ploughed 3in., medium 2½in., and light 2in. All land that is not sandy should be harrowed as soon as possible after ploughing in order to pack the soil and start the germination of weeds. After the first good rain has fallen and weeds have germinated, the land should be cultivated with a narrow tyne cultivator, in order to kill the weeds that have germinated, and increase the bacteria in the soil. After the next good rains have fallen and the land is beginning to dry on top, it should be harrowed again. Fallow should always be harrowed after every good rain, never allowing the land to crust on top. This acts as a blanket, preventing the moisture from evaporating." In reply to a question, Mr. Murphy said if it was possible to control the drift it might be as well to allow the sand from the ridges to drift down on to the flats. Once this sand started to drift it was practically out of control. The ridges should be worked with a rigid-tyne cultivator, and left in a rough state to try and prevent them from drifting, and to conserve moisture. Mr. J. Sampson advised fallowing the sand hills to a depth of 3in. or 4in. He had dealt with some of the sand hills on his farm last year in this way, and found that the hills did not drift so much after this treatment. Mr. O. Murphy said when fallowing a piece of ground last year he left a portion of one sand hill uncultivated, and noticed after the heavy rains in December that this piece of land was continually on the drift, worse than any other piece of land on his farm. Mr. O. Wagner considered that a rotation of crops would turn out fairly well on an average, although this would need to be very closely tested for a term of years.

#### WARRAMBOO.

June 10th.—Present: 22 members.

**CARE OF FARM HORSES.**—Mr. J. Sampson read the following paper:—"Horses should be provided with a warm stable, and plenty of good feed and water. If it is not convenient to build a stable, a shelter can be provided. Also provide the team with well-fitting harness, and give it an occasional dressing of oil. Groom them before harnessing, and on the first sign of a sore shoulder the collar should be eased, which will perhaps enable the horse to be worked, and at the same time heal the sore. Most troubles start in the first place with the collar being too big. I find cutting the fold off the top of a wheat bag and doubling it and putting under the collar, and if one is not enough, put two, and so on until the collar fits firm on the neck. By no means let it work on the neck—that causes the collar to chafe. A good plan is to soak a new collar in water before putting it on, and that will pull into the right shape on the horse's neck. See that the collar is clean before putting it on, and that the horse's neck is clean. Never bring in a horse out of the paddock and put him on hard feed straight away. I find that giving him one feed the first day and gradually working him on to it does not seem to affect them so much. Care should be taken not to over-heat a horse if it is at all subject to sand."

**CARE OF HORSES.**—Mr. N. Crawford read the following paper:—"Care of horses is a point of importance. Care should be taken in selecting a team of a good, active type of horse. To ensure a good, fast team one should breed young horses each year, and not break them in too young. A good stable, warm in the winter and cool in the summer, goes a long way towards keeping horses fit for work. I prefer a stable with a straw roof; it is warm in winter and cool in summer. After a long spell horses should be stable-fed, and not worked too long for the first week, and care should be given to the shoulders when breaking in a young horse. It is a good thing to wash the shoulders with cold water when you take off the collars. It will make the shoulders hard, and save a lot of trouble afterwards. Horses still hold their own, and a farmer should give attention to his brood mares. They should have plenty of green feed, both before and after foaling. When weaning foals they should have plenty of feed."

**MANAGEMENT AND CARE OF THE HORSE.**—Mr. E. Oswald read the following paper:—"The horse, we should at all times acknowledge, has intelligence, and will respond to good treatment. His only return for all the work that he does for us is his food and grooming, and occasionally extra care when he is sick or injured. Surely, then, all fair-minded men who are responsible for his care will be sufficiently good sportsmen to give him his just due. Unfortunately, with the hard times farmers are experiencing, the horse's fare is below standard in most cases, and we cannot therefore expect such a big day's work as would be the case in normal times. Illness in horses in this district



is mostly the result of sand, and the movement of that out of the horse in most cases results in its health returning to normal. I have used a mixture of half a pint of new milk and half a cup of honey as a drench, to which a dose of nux vomica was added, with good results. I particularly favor the horse having a few weeks' rest after seeding out on good green feed, with one feed of cocky chaff or hay, when hay chaff is not available. This results in the movement of the sand in the majority of cases. As to the handling of horses, I treat them kindly and firmly. Occasionally a horse is encountered that has bad and vicious habits. These are either the result of heredity or through mishandling during 'breaking-in.' If the result of heredity, little improvement can be expected, but faulty handling in its earlier life may often be corrected if one is prepared to spend time and patience in finding out the horse's viewpoint which he formed in his earlier life, and educating (or rather 're-educating') him. To be a success at handling horses, as of men, one needs to be a psychologist. I have a personal dislike to using the whip on horses, and usually manage to get a fair amount of work done without its use. As is good advice with the tractor, so with the horse team: Under-loading is preferable to over-loading."

#### YADNABIE (Average annual rainfall, 14.09in.).

Mr. W. Brown presided over an attendance of 12 members at the meeting held on June 10th. Officers were elected for the ensuing year.

#### YEELANA (Average annual rainfall, 16.12in.).

Meeting held March 12th. Present: 16 members. Mr. H. Adams (District Agricultural Instructor) gave an address, "Crop Rotation."

Meeting held April 9th. Present: 25 members. Mr. A. Ferguson, of the Moonta Branch, read a paper, "The Skim Plough."

Thirty members and visitors attended the meeting held on May 22nd, when addresses were delivered by Messrs. E. L. Orchard and H. D. Adams, of the Department of Agriculture.

### EASTERN DISTRICT.

#### (EAST OF MOUNT LOFTY RANGES.)

##### BOOLGUN.

Meeting held June 12th. Present: 21 members and seven visitors. Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Fallowing and Cultivation Methods," after which a lengthy discussion followed.

##### BUGLE.

June 10th.—Present: 15 members.

CARE OF STOCK AND NEED FOR A VETERINARY SURGEON.—Mr. B. Rohrlach read the following paper:—"Stock need a lot of attention in this district, and particularly horses. We have the usual trouble with sand, paddy melons, &c. Most farmers have their own special remedies for these complaints, but in most cases the animals die. Usually not much notice is taken of an animal that has been ill for a day or so, and when it gradually gets worse it is too late to get a 'vet' from the city. If a local 'vet' was available much valuable stock could be saved. In this district, where the farms are large, the holdings are a long way from town, and it costs much money for car hire to get a 'vet' out in addition to paying for his service. I suggest that the Loxton, Parunga, and Parana councils, and perhaps Waikerie and Berri, engage a qualified 'vet' between them, and if he resided centrally to each of these places he could serve them all. As regards his salary, if all ratepayers paid in addition to their council rates, the services of the 'vet' would be free of charge, charging only for mileage of the car."

##### COPEVILLE.

May 21st.

The meeting took the form of a debate, "Combines *versus* Cultivator and Drill." Messrs. A. P. Hein, L. Carslake, and G. H. Sutherland supported the combine, and Messrs. D. Neely, W. Johns, and C. Beckman spoke in favor of the cultivator and drill.

##### COPEVILLE.

Mr. C. F. Anderson (Acting Poultry Expert) addressed the meeting. A large number of members and visitors attended. The meeting concluded with a social and dance.

##### KALYAN.

There were ten members present at the meeting held on June 18th, when a paper, "Fertilisers," was read by Mr. V. Luhrs. It was decided to hold meetings alternately at Kalyan and Perponda.



## KANNI.

The meeting held on May 10th was attended by 10 members and five visitors, and took the form of a Question Box, when various subjects were introduced for discussion.

## KANNI.

Meeting held May 22nd. Present: 13 members and six visitors. Addresses were delivered by Messrs. W. C. Johnston and R. L. Griffiths, of the Department of Agriculture.

## KULKAWIRRA.

May 13th.—Present: 15 members.

The meeting took the form of a "Question Box." In answer to a question as to whether heavy super on new land caused it to dry out, Mr. Elliot stated that it caused too much growth, with the result that when warm weather came there was insufficient moisture in the soil. As to the most profitable breed of sheep for the district, Mr. Coombs considered that the Corriedale ewe crossed with a Dorset Horn ram was best for producing lambs for market. Mr. Fitzgerald favored pure Merino, because the wool was more saleable than crossbred, and crossbreds were such bad fencers. Where crossbreds were wanted, he favored the Shropshire cross. Mr. Elliot instanced Corriedale lambs at five months weighing 50lbs. Corriedales lived and fattened where Merinos barely held their own, were better mothers, and had better lambs. He did not like the Dorset or Shropshire, because the wool was inferior. In answer to an inquiry for the best method of dealing with two-year old shoots to get the best crop results, Mr. Oakley advised disc ploughing twice and cropping. The question whether it would be profitable to grow lucerne in the mallee was brought forward. Members expressed doubt on account of the dryness of the country during the growing period. Some members stated that the plants lived for years, and appeared again whenever good rains fell.

## KULKAWIRRA.

Mr. Coombs presided over an attendance of 15 members. The Annual Report was presented, and officers elected for the forthcoming year.

## LAMEROO (Average annual rainfall, 16.33in.).

Eighteen members and two visitors attended the meeting held on June 28th. An instructive paper, "The Farm Water Supply," was contributed by Mr. J. Kakeschke.

## MERIBAH (Average annual rainfall, 11.70in.).

Eleven members and four visitors attended the Annual Meeting, which was held on June 28th. After the election of officers, the meeting took the form of a social and dance.

## MILLENDILLA (Average annual rainfall, 13in.).

June 2nd.—Present: 10 members.

**WILD OATS.**—"Which is the best way to work fallow which is covered in wild oats, shallow or deep?" Mr. V. Eichler, who put the question, said that it had been his experience that working shallow, especially before seeding, was better. Last season he had worked one piece with heavy (scarifier) harrows and the other with light harrows, and that worked with light harrows was practically free from oats, whilst the other was badly infested. Mr. F. Barmann supported, and said that he had the same experience. Mr. V. Wegener said his land had wild oats coming through just before seeding, and in order to destroy them had put the cultivator through the oats about 4in. or 5in. deep; the crop turned out a failure on account of takeall, and where there was no takeall the oats smothered the rest of the crop. He also pointed out that wild oat seed lay dormant in large clods of earth, and towards seeding, when the land was usually worked to a fine tilth and weather conditions were suitable, the seed germinated. Never should a consolidated seedbed be sacrificed to destroy wild oats, as they had the ability to come through up to 5in. of soil, and it was useless to try and root them out. Mr. J. Buckley thought wild oats could be fed off by turning a flock of ewes and lambs on them. "Which is the best way to eradicate marshmallow on fallow?" Mr. J. Buckley said the only effective method was to cut them out with a hoe or pull them by hand; no implement was effective in cutting them off on account of their tough roots. "How long is the grain of wheat safe when there is a little moisture in the ground?" It was stated that wheat would germinate three times, provided the shoot or young plant did not grow to any length; it died back, and the grain became covered with mould, thereby retaining sufficient germinating power to germinate again when sufficient moisture was present. It was decided to arrange a "permanent" question box into which queries could be put, and which would be answered at the next meeting. Mr. C. Zadow offered to have a question box made and placed in a convenient position.



**NUNKERI.**

An instructive paper, "Poultry on the Farm," was read by Mr. E. Harding at the meeting held on June 11th, which was attended by 14 members.

**PARILLA** (Average annual rainfall, 14.15in.).

Meeting held June 18th. Present: Mr. C. Niendorf (Chair) and 10 members. An instructive paper, "Economy on the Farm," was presented by Mr. H. Johnson.

Previous meeting held May 10th. Present: Seven members. Matters of local interest were discussed.

**PARILLA WELL WOMEN'S** (Average annual rainfall, 16in. to 17in.).

April 29th.—Present: nine members and six visitors.

The meeting was devoted to the election of officers, and four new members were proposed.

A further meeting was held on May 27th, and was attended by 15 members and 10 visitors. Mr. F. C. Richards (Assistant Secretary) addressed the meeting on the work of the Agricultural Bureau. At the close of the meeting, a social gathering was held in conjunction with the men's Branch.

**PARILLA WELL WOMEN'S** (Average annual rainfall, 14.94in.).

Meeting held June 24th. Present: 17 members. The following papers were read and discussed:—"Bread Making," Mrs. Blacksell; "Bun Making," Mrs. Beckman. Samples of bread and buns, made according to the recipes in the papers, were exhibited.

**PARRAKIE** (Average annual rainfall, 14.54in.).

Mr. W. Halliday presided over an attendance of 22 members and 12 visitors at the meeting held on March 20th, when Mr. R. L. Griffiths (District Agricultural Instructor) gave an address, "Grading and Pickling Seed Wheat."

A further meeting, attended by 18 members and six visitors, was held on May 2nd. Mr. R. Wilson read a paper, "The Type of Cow for Dairy Purposes."

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## PARUNA.

May 6th.—Present: 21 members.

Mr. R. L. Griffiths (Instructor for Murray Lands District) delivered an address, "Diseases of Wheat." Ball smut, he said, could be controlled quite effectively provided the farmer pickled the wheat properly. The cause of smut was neglect to sow good, clean seed and poor pickling. Mr. Griffiths pointed out that many machines of the grader and pickler combined were very uneven in the distribution of the dry pickle. He therefore urged the farmers to take particular care and see that every grain was properly pickled. Flag smut was becoming very noticeable throughout the district, and required careful handling, as it was a disease that very quickly spread. As a preventive he urged farmers not to graze the stubble on any account, but to burn it if possible. It had been proved that stock grazing on affected stubble would carry the disease to another part of the farm. Take-all, another disease, also required careful attention. The best method was bare fallow, then to grow a clean crop of oats, the seed to contain no wheat or barley. Two other diseases, whose life history was not known, but was being closely watched, were "No growth" and "Eel-worm."

## PARUNA, June 6th.

Present: Mr. A. C. Webb (Chairman) and 22 members. A special meeting was held to discuss the location of the experiments to be carried out on drifted sandhills. Messrs. A. Webb, F. Hondow, and F. R. Sumner were appointed to inspect land suitable on which to carry out the experiments. Mr. A. Petch suggested that each plot should contain a portion of undrifted soil; by doing so eight experiments would be carried out instead of four. A suitable piece of land was selected on Mr. F. A. Hondow's farm.

## CONFERENCE OF PINNAROO LINE WOMEN'S BRANCHES.

Twenty-seven ladies attended the special sessions held for women at the Conference of Pinnaroo Line Branches held at Lameroo on August 14th. Mrs. F. R. Koch (Wilkawatt) presided. The following papers were read:—"Laundry Work," Mrs. Oram (Wilkawatt); "Butter-making," Mrs. Phillis (Parilla); "Domestic Art in the Home," Mrs. Fewings (Pinnaroo); "The Sensible Kitchen," Mrs. Billing (Wilkawatt); "Cold Meat Dishes," Mrs. Mattischke. In addition to the interesting discussions that followed the reading of each paper, the following recipes and household hints were given:—To keep weedy flavors out of butter, add a few grains of saltpetre to the cream and stir twice a day.

**POTTED BUTTER.**—One pound loaf sugar, 1lb. saltpetre, 2lbs. of salt. Wash butter well and get all buttermilk from it. Crush sugar, saltpetre, and salt, and mix together. Add 1oz. of this mixture to every pound of butter (see that all small lumps of saltpetre have melted). Press into an earthenware jar, sprinkle salt on top to form a brine, and cover down. To make bread of a fine texture, delegates were advised to use less yeast and try adding some mashed potatoes to the bread whilst mixing it.

**CANDIED PEEL.**—To make candied peel, let peel dry one day, then soak in fresh water with a little salt added for three days. Boil a syrup consisting of two cups of sugar to one cup of water, pour on the strained pieces of peel, and allow it to stand until next day. Reheat the syrup to boiling point, again pour over the peel. Repeat three times and stand on a tray to dry with a little syrup in each peel.

**LAUNDRY WORK (DRESS SHIRTS AND COLLARS),** by Mrs. Oram (Wilkawatt).—Care must be taken to wash and boil out all previous starch from garments to be ironed. When starching collars, all should be put into the bowl at one time, so that the starch will be at the same consistency for them all. They should be rubbed well with the hands, wrung out, rubbed with a clean cloth, and rolled up in a clean towel for one hour. For shirt fronts, the starch needs to be very thin, and this thoroughly rubbed in. For ironing, a good, hot iron is necessary, but care must be taken not to have it scorching, as the collar must be rubbed with the iron until it is dry. When this special ironing has to be done, it is advisable not to try to do it the same day as the other ironing is done, because one must not be in a hurry to get it finished.

To treat a collar that persists in "blistering," it was recommended that all starch be washed out of the collar, dried, and then immersed three times in starch, wrapped up in a dry cloth for one hour, and then ironed in the usual way.

## PINNAROO WOMEN'S.

May 9th.—Present: 10 members.

**POULTRY.**—The meeting was held at Mrs. Nickolls' homestead, and the following paper was read by Mrs. Nickolls:—"To make a success of this sideline, stock should be bought from a reliable breeder. Now that the large size birds have proved themselves as good layers they can be reared for eggs and table purposes too. Birds should be housed properly and fed regularly. Poultry houses should face the north-east, which will permit of enough sunlight for the birds. Fowls require plenty of fresh air, but do not have a draughty fowlhouse. A concrete floor is good, and easy to keep clean. Petrol tins come in very useful for nests, water troughs, &c. A little clean sand is

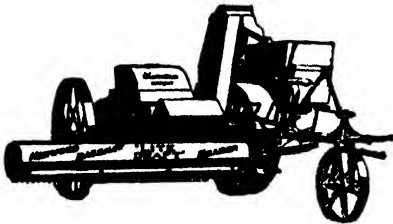


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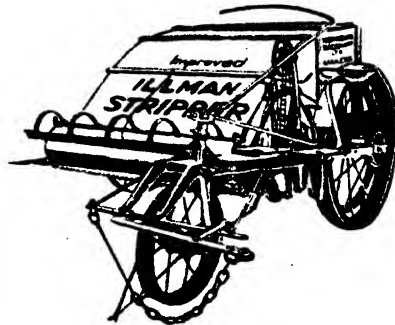


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good in one for a nest. Wheat is the best grain for egg production. Bran and pollard should be sound, and have a sweet, nutty smell. If sour, it may cause heavy losses. When using meat meal, 1lb. should be sufficient for 100 birds a day. Feed the meat meal in the hot mash in the morning in winter with chopped greenfeed. Give more greenfeed in the middle of the day. For the evening meal, feed wheat. Always see that the birds have plenty of fresh water kept in the shade. Shell grit is good to give the birds to peck at occasionally. Barley, oats, and rye are good winter fodders, also mustard and kale are recommended. Old crank case oil with kerosine is good for painting the perches for destroying tick in woodwork. This will also keep the fowls free from scaly leg mite. The scale is unsightly, causes lameness, and stops the hens from laying. Do not feed too much fruit in the fruit season. A little does no harm."

#### PINNAROO WOMEN'S.

June 6th.—Present: 11 members and two visitors.

Mrs. Fewings gave a demonstration of dressing poultry. She showed how to dress a fowl correctly for show purposes; how to bone a turkey; and how to stuff or season poultry, as well as other matters connected with poultry dressing.

#### RAMCO.

Mr. J. Boehm presided over an attendance of eight members at the meeting held on June 9th. Matters relating to the feeding of dairy cows on an irrigated fruit block formed the subject for discussion.

#### WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).

Meeting held May 20th. Present: Seven members and one visitor. Mrs. W. Nevill, sen., read a number of household recipes, which were well discussed by the members present.

#### WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).

Meeting held June 17th. Present: Eight members and one visitor. Mrs. A. Walsh read a paper, "Food Values," and supplied several useful recipes. Afternoon tea was served by the ladies.

#### YURGO.

The meeting of July 4th was attended by eight members, when an interesting paper, "Horses v. Tractor in the Mallo Districts," was presented by Mr. G. Tregilgas.

### SOUTH AND HILLS DISTRICT.

#### CHERRY GARDENS (Average annual rainfall, 35.03in.).

Members met at the residence of Mr. C. Terrell for the meeting held on July 5th. An interesting feature of the inspection of the property was the eradication of blackberries, which by constant ploughing, grubbing, &c., had been brought under control. Sown on land that was previously overgrown with blackberries, Mr. Terrell had successfully established an excellent plot of Subterranean clover. Afternoon tea was provided by Mrs. Terrell.

#### INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

Thirteen members attended the meeting held on June 17th, when an instructive paper, "The Cow on the Farm," was presented by Mr. Roads.

#### KANGARILLA.

June 13th.—Present: 14 members and visitors.

FARM EQUIPMENT.—Mr. L. Tune read the following paper:—"After several years' experience on farms in various districts, I have come to the conclusion that farmers work under difficulties. Many have few or no stock of bolts, nuts, &c., and a very poor assortment of tools. I have been told by employers that to have a good assortment of nuts, bolts, &c., and tools would cost much money, but this is not so. Most farmers visit a township or the city reasonably often, and for a few shillings spent each time it is surprising how quickly one can accumulate a stock of tools and other necessities. A few horseshoe nail boxes with cotton reels screwed in one end and fitted nicely in a big box make excellent drawers. The shed can be put in order when there is no field work to be done."

#### KANGARILLA WOMEN'S.

Meeting held June 19th. Present: Nine members and three visitors. The meeting took the form of a Question Box. Several questions were submitted for discussion.



**LENSWOOD AND FOREST RANGE** (Average annual rainfall, 35in. to 36in.).

On the occasion of the Annual Meeting, the Hon. Secretary (Mr. B. Lawrence) presented the Annual Report and balance-sheet, and officers were elected for the ensuing year. Other items, including "Codlin Moth Control," Pruning Apple Trees," etc., were discussed. Eleven members and visitors attended.

**MOUNT COMPASS.**

Meeting held May 1st. Mr. A. Kidman presided over an attendance of 35 members and several visitors. Mr. C. Verco gave an instructive address, "Stock Diseases in the Southern Districts."

**MOUNT PLEASANT** (Average annual rainfall, 27.46in.).

"Rural Competitions" was the subject of a paper delivered by Mr. Vigar at the meeting of the Branch held on May 9th, which was attended by eight members.

**RAPID BAY.**

June 12th.—Present: 17 members and three visitors.

**CARE OF THE BREEDING EWE AND TAILING THE LAMB.**—Mr. H. Hamlyn read the following paper:—"When financial difficulties confront the producer, more systematic methods and precautions should be taken of the flock. Adverse seasons have made sheep breeding more difficult in the past few years. This has been due to want of better management. Breeding ewes should receive first consideration. The flock should be mouthed, and faulty and weedy constitutioned ewes culled out for rations. This operation may be done soon after shearing and after the lamb has been weaned. Rams should be put with the ewes not later than the end of November, thus procuring an early lamb which will be well grown in spring when feed is good. After the rams have been mated, the flock should be frequently yarded or mustered into a small paddock for the first five or six weeks, to assure a better percentage and a more even lambing. During the mating season, the flock should be allowed to graze on good pastures. A month or five weeks prior to lambing, the ewes must be crutched and all rams removed. The wool should be clipped as short as possible; this gives the lamb a better chance to find the teats, and also minimises ravages of the blowfly. Every care should be exercised whilst crutching, in order not to handle the ewe roughly, otherwise losses may be expected. When lambing commences, the paddocks should be looked around once a day, to pick up any ewes that may be down or need attention. All dogs must be kept from the lambing paddock. A good plan, where possible, is to have the flock in several small paddocks for a few weeks, and as time goes on the ewes with the stronger lambs can be worked out into the larger paddocks. A little time spent in this direction is well worth while, more especially on a small holding. Changing the ewes from one paddock to another or on to any fresh picking will give them more milk, and so enable them to rear a better lamb. On no account should a ewe with a young lamb at foot be placed on dry feed. If droughty conditions prevail and hand feeding has to be adopted, some nutritious or milk producing ingredient must be given with the feed, otherwise the lamb might just as well be sacrificed to save the life of the mother. Before tailing operations commence, all yards should be cleaned out and refuse carted away to prevent disease. If a knife is used for tailing, it should be well-sharpened and sterilised before using. I prefer the searing iron; it is always sterilised in the fire bucket, and gives better results in many different ways. A day of moderate temperature should be chosen for tailing—not too hot or too cold—and sufficient hands should be available to enable the operation to be finished by 3 o'clock in the afternoon. This gives the ewe when turned out time to get a feed and mother her lamb before darkness sets in. Next, an inspection should be made of the flock to see that everything is in order. The flock should be left to settle down for a day or two before shifting or driving any great distance." In the discussion that followed, some members thought the knife was the best instrument for tailing. They considered that this method did not take so much out of the lamb. Mr. Hamlyn thought it took the lamb longer to get over the operation when the knife was used. He pointed out as an instance where one was rearing pet lambs and feeding them with the bottle, that the lamb tailed with the searing iron would take milk immediately after the operation, but the lamb tailed with the knife would often go several days before taking food. The writer of the paper considered that in cases where lambs were being bred for market, those tailed with the iron were ready for market a fortnight before those that were done with the knife.

**ROCKWOOD.**

Mr. C. Hodgson presided over an attendance of 10 members and two visitors at the meeting held on June 20th. Mr. F. Mudge read a paper, "Preparation of the Seedbed and the Treatment of Takeall." Officers were elected for the ensuing year.



# CROWN LANDS.

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Lands in the Hundreds as shown below are open to application until 3 p.m. on Tuesday, 7th October, 1930.

Lands in the Hundreds of APOINGA, BAROSSA, CAROLINE, COTTON, EBA, ENCOUNTER BAY, GAMBIER, HOLDER, HOOPER, KINGSFORD, KONGORONG, MAYURRA, MONARTO, PARCOOLA, PEEBINGA, PRICE, REDHILL, RIDLEY, TICKERA, VINCENT, WAITPINGA, and WARRENBEN.

Full particulars are published in the *Government Gazette*, and plans and detail may be obtained on application to the Secretary for Lands, Box 293A, Adelaide.

## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Secretary for Lands, Box 293A, Adelaide.

## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



# AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned:—

"First Aid to the Horse," by F. E. Place, B.V.Sc., M.R.C.V.S., &c.; price, 3s.; posted, 3s. 2d.

Journal of the Department of Agriculture, 5s. per annum in advance; 1s. per single copy to residents in South Australia. Other places, 10s. per annum; single copies, 2s. each.

The bulletins and leaflets may be obtained by sending a 1½d. stamp for postage.

All communications must be addressed—Editor, "Journal of Agriculture," Box 901E, G.P.O., Adelaide.

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.



# LIBERAL FEEDING— AND ITS RESULTS!

Under the heading "GREATER VIGOR AND BETTER FRUIT," the *Sydney Daily Telegraph*, of the 17th April last, called attention to the excellent results attending the use of

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**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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S. R. WHITFORD.  
*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### Conferences.

Conferences of the Agricultural Bureau will be held as under:—

Non-irrigated Fruits Districts, November 4th, at Angaston (Secretary, Mr. K. Robinson).

Papers, questions, &c., for Conferences should be in the hands of the General Secretary, Agricultural Bureau, Adelaide, a fortnight before the above date.

### List of Probable Dates of Country Shows During 1930.

| Name.                              | Secretary.      | Address.           | Approx. Date of Show. |
|------------------------------------|-----------------|--------------------|-----------------------|
| Central Yorke Penin.<br>(Minlaton) | D. M. S. Davies | Minlaton . . . .   | October 22nd          |
| Mount Gambier . . . .              | H. L. Kennedy . | Mount Gambier . .  | October 22nd and 23rd |
| Tatiara (Bordertown)               | A. F. Baker . . | Bordertown . . . . | October 29th and 30th |

*Secretaries of Show Societies are invited to advise the Editor of the dates of their Shows.*

### Fodder Crops for the South.

The following information is supplied by Mr. W. J. Spafford (Deputy Director of Agriculture) in answer to a request from the Langhorne's Creek Branch of the Agricultural Bureau:—

#### SUDAN GRASS.

Sudan grass is an annual sorghum which differs from the well-known forage sorghums in that the plants produce a lot of relatively fine stems rather than a few coarse ones. It is a summer-growing crop, and as such the seed should not be sown until the soil has warmed up in the spring, say, in September. Best crops are secured if sown in rows spaced about 2ft. to 3ft. apart, and the land between the rows kept loose and free from weeds by cultivation, but in good, rich locations the seed can be broadcasted or be drilled through every hoe of the ordinary seed drill. From 7lbs. to 10lbs. of seed per acre should be used, according to the method of seeding, and at the time of seeding at least 1cwt. superphosphate (45 per cent.) should be used. Sudan grass produces good, green forage, and can also be converted into a rather coarse, but palatable and nutritious hay.

#### RAPE.

Rape is also a summer-growing crop, and should be sown in spring, but as it will germinate when the soil is still fairly cold, and will grow in cooler conditions than will most other summer forages, it can be seeded in August in all but the very heavy rainfall districts of the State. Rape is a good crop on which to wean lambs or to fatten sheep, but when grown alone tends to scour all animals fed on it, and as a consequence it is usual to sow a little mustard with it. A mixture of 4lbs. rape, 1lb. mustard, and 1cwt. superphosphate can be drilled in with the ordinary seed drill, remembering that the seed should not be mixed with the superphosphate for more than four hours before it is to be drilled into the land. When livestock are feeding off the rape they should be gradually made accustomed to it, when it will be found to be a really good forage, particularly for sheep.

#### MANGELS.

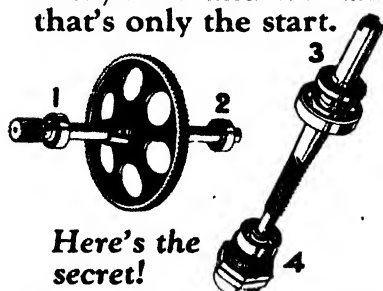
The mangel crop is an expensive one to grow, because it needs the same treatment as do market garden crops, in that the land must be kept well cultivated and free from weeds, and the plants must be widely and evenly spaced in the rows. It is seeded in



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# McCORMICK- DEERING



the spring with a drill, in rows about 30in. apart, using from 6lbs. to 10lbs. of seed per acre. After germination the rows are carefully thinned out by hand, and from then onwards the land is constantly cultivated, and all weeds are removed. The crop is a heavy feeder, and so should be well manured, and, if possible, 20 tons or more of farmyard manure should be spread per acre before ploughing, and then 3cwts. to 4cwts. of superphosphate and 1cwt. to 1½cwts. sulphate of ammonia should be applied as well. Enormous yields of mangels can be obtained in suitable locations, and it makes an excellent winter feed for dairy cows. In the late autumn the roots should be lifted, trimmed and stacked in clamps, and protected with straw and soil, so that they will properly mature for winter feeding. If the roots are to be fed to livestock soon after being lifted they should always be left lying on the surface for some days to properly wilt, or else they should be sliced and a small quantity fed in admixture with chaff and other foodstuffs. If fed whilst still in the ground or as soon as lifted, trouble is being courted, as in some conditions they prove fatal to livestock, particularly to dairy cows.

#### WIMMERA RYE GRASS.

Wimmera rye grass grows well in this State wherever barley grass flourishes, and it replaces this latter grass with advantage, because it is more nutritious, more palatable, and has no stage when it is objectionable to farm stock. It is easily established by drilling in a couple of pounds of seed per acre with a cereal crop which is to be harvested for grain. The seed is collected with the harvester, and being light is blown out of the tail of the machine, and is distributed all over the field. If a pure stand is required, 10lbs. to 15lbs. seed should be drilled to the acre into prepared land with at least 1cwt. superphosphate, and this should be done in the autumn or early winter. Wimmera rye grass is an annual, but it behaves like other weeds, and seeds itself with such surety that once established it will always be present. Livestock do well on this grass, and in the good years it grows like a cereal crop and makes first-class hay.

---

#### Flax Culture.

Mr. W. J. Spafford (Deputy Director of Agriculture) has supplied the following information relating to flax culture to the Tantanoola Branch of the Agricultural Bureau:—Flax can be grown in most well-drained fertile soils in districts where the average rainfall exceeds 22in. per annum, and particularly so in such districts if the soils are of a type which produce good cereal crops. It should be seeded in April, and can be broadcasted or be drilled from the wheat cups of the ordinary seed drill. If the crop is to be grown for linseed only, about 30lbs. of seed per acre is sufficient, but if for flax and linseed then from 60lbs. to 65lbs. of seed is necessary. Manuring should be something the same as for cereals, but best results are secured if the land is in such good heart that only light manuring is necessary. During the growing period of the crop all tall-growing weeds should be pulled by hand. The crop is harvested with a binder when the bolls have turned a golden brown color, and if the fibre is to be saved, the heads are passed through rollers which liberates the seed, then the stalks must be retted, either in water which takes about 20 days or by spreading it on grass and turning it a couple of times, when the dew will lead to complete retting in five or six weeks. If grown for seed only, the crop is cut with binder and the seed removed with a header, or it is harvested in the field, as are cereal crops, with a reaper-thresher. The straw that remains is used as a foodstuff for farm animals or for anything that the cereal straws are useful for. A seed crop should yield somewhere about 20bush. per acre, which at present is worth somewhere around £15 per ton. We have no means of knowing what fibre is worth at present as it is not produced in this State, and, as a matter of fact, there is very little produced anywhere in Australia.



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**Barley for Grazing.**

Replying to the question, "Which is the best crop to grow for grazing in the Mallee—wheat, oats, or barley?" which was submitted by the Boolgun Branch of the Agricultural Bureau, Mr. W. J. Spafford says mixtures of two or more cereals produce more green forage than if the different kinds are sown separately, and in all probability for most Mallee districts in this State, it will be found that a mixture of 30lbs. oats and 30lbs. rye per acre will provide more grazing than any other mixture. If no rye is available, a mixture of 50lbs. barley and 30lbs. oats per acre will be quite suitable; but it may be better to use a mixture comprised of 30lbs. barley, 30lbs. oats, and 20lbs. wheat. If full grazing results are to be secured, plenty of seed must be used, because the competition of closely packed plants forces all plants to grow quickly, and so much more feed is provided when it is most needed, *i.e.*, in the winter. Early seeding is also essential if winter feed is to be secured. If a single cereal is to be grown, oats sown early is preferred to the other cereals. Of the barley varieties commonly grown in South Australia, either Roseworthy Oregon or Shorthed will prove superior to others for the Mallee districts.

**Popular Wheat Varieties.**

"A list of the most popular wheats in this State, showing whether early, late, or otherwise." This question was asked by the Miltalie Branch of the Agricultural Bureau. Reply:—The twenty (20) most popular wheats are:—Gluyas (very early), Late Gluyas (early), Ford (mid-season), Federation (mid-season), Currawa (mid-season), Sultan (early), Nabawa (early), Caliph (early mid-season), Daphne (early), Joffre (mid-season), German Wonder (mid-season), Florence (early), Major (late mid-season), Felix (early), Canberra (very early), Queen Fan (mid-season), Gallipoli (mid-season), Silver Bart (early mid-season), King's White (very early), Yandilla King (late mid-season).

**Pickled Barley for Livestock.**

"Would it be safe to crush and feed to stock barley that has been pickled with formalin at the rate of 1½ eggeups to 4galls. of water per 3 bags of barley?" This query was received from a subscriber to the *Journal of Agriculture*. Reply:—The small amount of formalin present on the barley pickled by your method would not injure livestock in any way, even if fed to them soon after having been pickled, and the danger becomes less and less with time. Formalin is a solution of a gas (formaldehyde) in water, and as the pickled wheat dries much of this gas is liberated into the air, and as time goes on all of the formaldehyde is eventually given off, so that some little time after being pickled and dried there is not much formalin left to affect the grain in any way.

**Fodders for Dairy Cows.**

A correspondent at Loveday (River Murray) sought information as to (1) what crops could be grown under irrigation conditions to replace bran or concentrates for feeding to cows, (2) the value of crushed sunflower seed compared with bran, and (3) the feeding value of crushed maize. These queries were submitted to the Chief Dairy Instructor (Mr. H. B. Barlow), who says (1) lucerne is in many respects a complete food and will give excellent results without the addition of any concentrates. Such things as pumpkins, turnips, mangolds, &c., if cut up and fed with lucerne chaff, will give good results. (2) Crushed sunflower seed has a higher feeding value than bran, and is comparable to linseed meal. Bran has an added advantage for feeding dairy cows, since with dry feed it has a laxative effect and is very palatable. (3) Crushed maize is an excellent concentrate for dairy cows, and should give quite as good results as bran or oats.



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(PATON)



**Barley for Hay.**

Mr. R. C. Scott (Supervisor of Experimental Work) has tendered the following information to the Elbow Hill Branch of the Agricultural Bureau:—On account of the fact that barley dries out to a very light weight on cutting for hay, it is not generally utilised for this purpose. However, weight for weight it makes a good quality foodstuff comparatively with wheaten hay. The time to cut is the same as that for wheat, namely, when the grain has reached the soft dough stage, and it is better to err on the green side than to allow the crop to become over-ripe. The following is the average of analyses of wheaten and barley hay, the latter being quoted by Henry in his "Feeds and Feeding":—

|                         | Wheat.       |                          | Barley.      |                          |
|-------------------------|--------------|--------------------------|--------------|--------------------------|
|                         | Composition. | Digestible Constituents. | Composition. | Digestible Constituents. |
|                         | %            | %                        | %            | %                        |
| Moisture . . . . .      | 10.0         | —                        | 15.0         | —                        |
| Ash . . . . .           | 6.2          | —                        | 4.2          | —                        |
| Protein . . . . .       | 5.1          | 2.8                      | 8.8          | 5.7                      |
| Fibre . . . . .         | 24.4         | 7.9                      | 24.7         | 15.3                     |
| Carbohydrates . . . . . | 53.5         | 33.7                     | 44.9         | 28.3                     |
| Fat . . . . .           | 0.8          | 0.5                      | 2.4          | 1.0                      |

The figures for barley were obtained from samples cut in the milk stage and indicate a higher percentage of digestible protein, fibre, and fat, and a lower percentage of digestible carbohydrates than wheaten hay. It is customary to compare foodstuffs by what is termed the "starch equivalent," and by calculation this is found to be 30.9 per cent. for wheaten hay and 36.5 per cent. for barley hay. Therefore, from this point of view the latter fodder shows to advantage, but because of its bulky nature and low yield per acre the production of wheat hay is to be preferred.

**Treatment of Salt Patches of Land.**

Replying to the question, "What treatment do the Departmental Officers recommend as likely to bring back patches of magnesium or salty ground to a state of fertility?" which was submitted at the Conference of Upper North Branches of the Agricultural Bureau, Professor Perkins said this question was far more difficult to reply to in the North than in districts with a heavier and more regular rainfall. A similar question had been put to him by farmers on Yorke Peninsula, and he had had the satisfaction of learning a few years later that the treatment recommended had proved satisfactory. The solution of the difficulty depended primarily on the origin of the salt. "Where does it come from and why does it settle on a given spot whether a whole field is affected or only limited areas which show no signs of extending?" Essentially it should be remembered that salt, because of its ready solubility in water was extremely mobile in the soil, varying in its position from year to year and even from season to season in the same year, and because water tended to flow towards low spots and hollows, so normally salt which was carried in water tended to accumulate at those low spots and hollows. Generally speaking salt was more frequently encountered in arid and semi-arid districts than in localities of heavy rainfall because of the absence of a means of removing it by natural drainage; where rivers existed, rains that found their way into the rivers carried the salt to the sea, which was the great salt water reservoir of Nature. The sea returned it in the form of spray to coastal lands, and even penetrated the interior in time of gales. Disintegration of rocks also lead to the formation of salts. In this State salt did comparatively little harm to crops. Suppose, however, an abnormally wet year were experienced in an arid district. The heavy rains dissolved much of the salt scattered over the land; they drained towards the lower spots, evaporated, and left behind a dangerous accumulation of salt in the surface layers which would prove dangerous to vegetation. Here the salt remained unless removed, which could be done by under drainage if an outlet for drains could be found and if the rainfall were sufficiently heavy to reach the drains. But even in most circumstances the drainage



would be very costly, and not worth while except on land of very high value. To ensure some degree of success with this treatment it was necessary to understand how the salt acted. Owing to its solubility in water it was dissolved by Winter rains, and penetrated as deeply as the yearly rainfall penetrated. Hence, in Spring the salt was as deeply seated as at any time of the year. Throughout the Summer it rose to the surface with capillary water which was evaporated, and was left on the surface, and evaporation continued until late Autumn. Hence surface salt concentration was at its maximum towards the end of Autumn when farmers wanted to sow their seed. This condition of excessive concentration prevented all germination, and the land continued bare throughout the season and subject again to intense Summer evaporation. There were two points to be recalled if they wanted to minimise trouble:—(1) They must check evaporation and consequent salt concentration, and (2) sow at a time when the surface was comparatively free of salt.

To check evaporation the salt patches must be kept under vegetation of some kind or other. Heavy dressings of straw and stable manure would also help. In ordinary circumstances they could not hope to grow wheat on these salt patches with any chances of success, because crops must be seeded late in the season when rain had washed the salt into the depths of the subsoil beyond danger of damage to germinating seed and young plant roots.

The safest plan was to plough the salt patch late in Autumn on a good deep furrow in such a fashion as to invert the furrow slice completely. At this time of the year nine-tenths of the salt was concentrated in the first inch of soil at the end of a long, dry summer. If a 6in. furrow slice was completely inverted, it would place the salt layer 5in. below the surface, and early Winter rains penetrating the broken surface would carry it down deeper still. That would tend to sweeten the surface layers in which the seed germinated and young roots developed. Hence he had always recommended sowing not wheat but barley, not because it was more resistant to salt than wheat—which it was not—but because it could be sown with safety very much later, say, late in July. It would germinate, and by keeping the soil covered, prevent the rise of the salt under evaporation. If possible, old stable manure could be worked into the land prior to seeding.

If, owing to a lack of a sufficiency of Winter rains, barley failed, Sudan grass could be sown as soon as the soil was warm enough. If it germinated, it would cover the soil and check evaporation and provide feed. It should not be fed too close so as to maintain a cover of vegetation as long as possible. Bearing in mind that nine-tenths of the salt present was towards Autumn in the first inch of soil, the surface could be scraped off with a sharp scoop and removed if one had the means of doing so. Treatment such as he outlined had proved successful on Yorke Peninsula, but he could not guarantee it in the absence of a sufficiency of rain. Crops would absorb some salt and so reduce the quantity present. The main object, however, was to check concentration.

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## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

"W. Bros.," Coomandook, report light draught mare which is lame with a swelling above fetlock on back leg.

Reply—It can only be assumed that the swelling is on the back of the affected leg and affects the tendons and sheaths. Treatment: A hot antiphlogestive poultice should be applied to the affected part and covered with a bandage. Repeat daily for seven days. When heat and pain have disappeared, bandage fairly tightly for seven-ten days, removing and replacing bandages daily, then turn out for at least five months.

"E. H.," Moorlands, has aged gelding with swellings on the inside and outside of the knee and the offside front leg.

Reply—Clip hair over swelling and rub a blister of biniodide of mercury (1-8), which you will have to obtain from a chemist, into part for 10-15 minutes. Be careful not to rub into folds at back of knee. Tie horse up short so that it cannot lick part and next day wash off blister and rub in a little olive oil. Turn horse out for four-six weeks.

"H. McD. V.," Mount Pleasant, asks treatment for sucking lamb about three months old which developed stiffness in the neck, limbs, and jaws.

Reply—The symptoms described are typical of tetanus, commonly known as lockjaw. It is not stated whether the lamb was an orphan or had been "marked." The cause is a germ which as a rule gains entrance through a wound, and not infrequently follows docking of tail, &c. The treatment to adopt is to search carefully for wounds. When found, wash them with a disinfectant solution, remove the scabs, and apply strong lysol to the surface. As the symptoms develop only after damage has been done to the nerve endings (spinal), the mortality is heavy, and preventive measures such as follow are the best cure. When lamb-marking, see that all knives, &c., are sterilised by boiling and kept in a dish of strong disinfectant (lysol, two tablespoonfuls to the pint of water), also that the operation is carried out away from old sheep yards (the soil of which teems with the causal organism). After the operation is completed, the lamb should be released on clean ground and not placed in yards.

"A. L. V.," Brentwood, has heifer difficult to milk.

Reply—The condition described is probably associated with the first functioning of the mammary gland and due to congestion. The following treatment is advised:—Application of hot fomentos to the udder for 10 minutes at a time, with water kept at even temperature, but not hot enough to scald. Dry well and then massage the udder gently but firmly with camphorated oil. This treatment should be carried out twice a day before milking.

"C. B.," Riverton, reports gelding discharge from nose, offensive breath, heavy cough, and labored breathing.

Reply—The horse has possibly got pneumonia. Put in a warm airy shed and rug. Supply green feed and bran mashes. See that plenty of fresh drinking water is available. Have the following medicine made up:—Ext. belladonna liq., 4 drams; potassium chlorate, 4ozs.; powdered camphor, 1oz.; glycerine, 4ozs.; treacle, 8ozs. Give a tablespoonful on tongue three times daily.

"E. W.," Brimpton Lake, reports (1) cow with lump near the top of one teat; (2) death of pig. *Post-mortem* showed long worms in gut.

Reply—(1) The lump may be a sequel to mammitis or inflammation of the udder. Further, in certain families possessed of narrow supple teats, growths in the interior of the teat may develop during the first lactation period. Treatment is not satisfactory. As milking



is unaffected, I would not suggest interference. (2) These worms are known as "Ascaridae," and affect young pigs in particular. Weaning time is the most susceptible period. Affected pigs become listless, will not eat, cough frequently, and breathe with difficulty. There is a marked heaving of the flanks and breathing is increased (thumps, heaves). Less badly affected pigs do not eat well, rapidly lose condition, and become stunted. Frequent fits of coughing. Convulsive fits are uncommon. Various treatments can be recommended. The following is suggested (treat each affected pig separately):—(1) Starve for 24 hours; allow water only. (2) At the end of that time give santonin in a small feed of skim milk and pollard. The dose is as follows:—For a 15lb. pig, 2 grains; for a 30lb. pig, 3 grains; for a 45lb. pig, 4 grains; for a 60lb. pig, 5 grains; and so on up to a maximum dose of eight grains. Give medicine in the evening. (3) Next morning give Epsom salts (4ozs. for a pig of 100lbs). To administer, dissolve in warm milk (a quart of milk to each ½oz. of Epsom salts). Besides medicinal treatment, all manure should be burnt. This treatment will only get rid of worms in the pig, and will not prevent reinfestation, which occurs through pigs eating feed infested with the eggs. The following sanitary measures are recommended to deal with the infestation of the premises:—(1) If sties are old and insanitary and not of great value, it is suggested that the site be moved. (2) All pigsties should have floors which are impervious to moisture—concrete or brick. (3) Drainage should be supplied. (4) Open grazing in small paddocks of young pigs. (5) Regular cleaning of sties and disposal of manure.

"W. B. D.," Pinnaroo, has (1) mare in low condition, infested with lice, and cannot raise her head. (2) Mare in foal, off feed, and breathes quickly.

Replies:—(1) The weakness and stiffness may be due to an ankylosis (or knitting) of the spine, in which case a recovery cannot be looked for. It may only be associated with the general debility, and the following course of treatment may be tried:—(1) To rid the animal of the parasites, which are most probably lice, clip all over first, if the coat is at all heavy, and burn the clippings. Choosing a bright sunny day, wash all over with warm soapy solution, with a teaspoonful of lysol added for each pint of water. Apply with an old grooming or scrubbing brush. Dry thoroughly. These washings should be repeated two or three times at intervals of a week to 10 days. (2) Have animal's teeth attended to if possible. Give internally to commence with a drench of raw linseed oil, 1½ pints; turpentine, four tablespoonfuls. Subsequently, supplement grazing by giving bran and chaff, and give one tablespoonful of Fowler's solution of arsenic in damped feed night and morning for a fortnight. The condition is probably due to the combined factors of work and advancing pregnancy. Probably the best thing would be to turn the mare out on suitable green feed till after foaling time.

"M. N.," Wauralte, reports death of cow due to milk fever, and asks for treatment for future cases.

Reply:—The only treatment to apply is to pump up the udder tightly and tie teats with tape; remove after two hours. After inflation gently massage udder. Prop cow up on brisket and turn from side to side every three-four hours. If no improvement, repeat pumping every few hours until she rises. This treatment is usually successful, but not always so.

"W. H. P.," Sevenhills, reports lambs with swollen ears, nose, and mouth.

Reply:—The symptoms described are similar to those shown by sheep which are grazing on trefoils or clovers, the disease being known as Trefoil dermatitis. It is due to the presence in such plants at certain periods of a substance which in conjunction with

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strong sunlight causes a reaction on unpigmented skin, such as ears, face, and on the back. It is suggested that sheep be moved into another paddock, and that affected lambs be kept housed or in shade. Lamp black and oil may be applied to affected parts. It would be interesting to hear further particulars from you as to whether the pasture the sheep have been on is luxuriant in growth, also a description of the symptoms, such as whether there is redness, weeping, and if ears necrose.

"A. B. M.," Brinkley, asks cure for worms in pigs.

Reply—Starve the pigs for 18-24 hours. Then give the following dose:—Santonin, 5 grains; calomel, 5 grains, for a pig weighing 100lbs. (Increase or decrease the dose proportionately according to the weight of pig treated). The following day give 2ozs. to 3ozs. Epsom salts in thin slops. To prevent reinfestation, it will be necessary to thoroughly clean out the floors of sties and the feed and water troughs twice weekly.

"E. A. R.," Tarnna, reports (1) cow with film over eye; (2) lice on pigs.

Replies—(1) Bathe the eye with lukewarm boracic lotion and instil a few drops of the following into the eye two or three times daily:—Zinc sulphate, 4 grains; boracic acid, 4 grains; distilled or boiled water, 2 tablespoonfuls. (2) Use the following preparation:—Hard soap, ½lb.; kerosene, ½gall.; water, 1gall. Dissolve the soap in the water first, then add the kerosene and mix well till it is all emulsified.

"E. H. W.," Kybybolite, asks treatment for cow with "itch."

Reply—The condition is due to lice, and is a common complaint during the winter and early spring months. Treatment: Procure from a chemist a quantity of sodium fluoride (1oz. per head of stock), and by means of a tin shaker apply it to the body and parts affected and then rub it in with the hands. Repeat if necessary in five days.

## ORCHARD NOTES FOR SOUTHERN DISTRICTS. OCTOBER, 1930.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

Orchard practice this month, with that of last month, will have a great influence on the quality of the fruit to be harvested, and probably on the quantity as well. If cultivation and preventive spraying have been carried out thoroughly we will have little to fear about the crop, given normal weather. But we must continue the work to get best results; soil surface must be kept loose and free from weeds, and the necessary sprays must be applied at the correct time.

For fungus diseases after the fruit has formed use lime sulphur sprays, or dry powders when the weather is such as demands this precaution; lime sulphur is preferred, because the copper mixtures have a tendency to russet the fruit. Vines require the finest sulphur mixture with a good blower if *Oidium* is to be checked. Aphides, thrips, and red spider must be stopped, or damage will result; black leaf 40, wet or dry, will give good return for the best efforts.

For codlin moth we have to rely on arsenate of lead, and we must have it on before the calyx closes, commencing when the majority of petals are falling. After the fruit has formed it is necessary to keep a coating of arsenate of lead during the growing period, or one or other of the white oils may be used, care being exercised not to spray on very bright days. The addition of black leaf 40 adds to the efficiency and makes it a dual purpose spray.

See that young trees (especially citrus) and vines do not suffer for want of water, and always loosen the soil about them after watering.

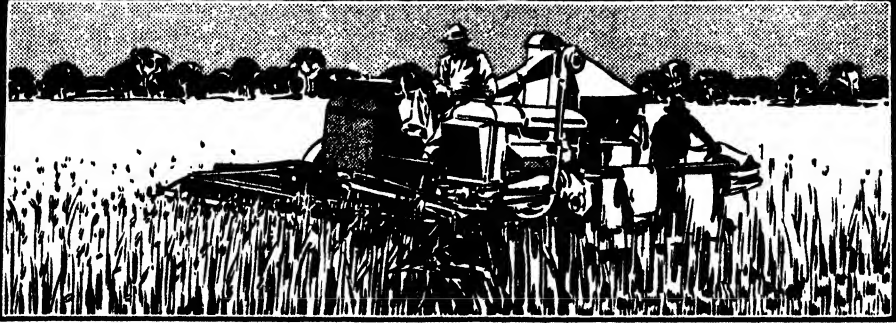
Strawberries may still need sulphuring if mildew shows; it should be applied only lightly, or it will cause considerable damage on a hot day.

Tomatoes require attention continuously, as disease runs through a plot so quickly; root out and burn all diseased plants; use only enough water to keep the soil moist; open up houses on very hot days, and close again at night.

Cincture vines as the caps start to fall from the blossoms; a narrow cut is all that is required, not more than 1/16th of an inch wide, and through the bark only.

Picking bags or boxes, trays, and other drying equipment should be clean and in repair ready for use.





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## ENSILAGE MAKING.

---

The questions contained in the accompanying article were submitted by a correspondent at Watervale to Professor Arthur J. Perkins (Director of Agriculture), who has supplied the desired information.

1. *I have an old stone room with cellar beneath. This is 12ft. square, and by removing the floor I could get an approximate height of 15ft. Would this be a suitable place to use as a silo?*

It is preferable to have a circular silo because the corners of the square do not allow the whole material to slip down as evenly as in a round silo. The chief danger is that you will have air spaces in the corners on which the ensilage will go mouldy. I suggest that if you follow out your plan you round off the corners as much as possible. For a silo pit having, say, a diameter of 12ft., the proper height would be 24ft., so that the height you have available—15ft.—is rather low. You can, however, overcome this difficulty by heavily weighting the silo when you fill it up.

2. *In wet winters the cellar is very damp; in fact, water has accumulated at times. Would this be detrimental?*

The result of having water seeping into your silo will probably lead to the loss of some of the ensilage at the bottom of the pit. I understand that the cellar has not been faced, and suggest that you cement it before you use it as a silo, particularly as the smooth surface is essential to the gradual settling of the ensilage.

3. *What is the correct temperature?*

4. *How is the temperature controlled?*

5. *Is it necessary or advisable to use a thermometer, and if so, where can such be obtained?*

I do not think it is necessary to worry about a thermometer to follow out the rise in temperature. The rise in temperature will follow normally, and the rise will be quite sufficient in the 12 hours' interval which will take place between each working day. The thing to do is to avoid too high a rise in temperature, which is wasteful of the material, and the way to get over that is to fill as rapidly as possible and to have no interval in the way of filling. If by some mischance you are obliged to stop before you have filled your pit, level it out as carefully as you can, tramp it down and weight it, and then remove the weights and start again.

6. *What is the correct stage to cut cereals for silage?*

The correct stage would be, say, from 10 days to a fortnight after the anthers of the flowers show outside the head of wheat, or probably—according to districts and seasons—from a fortnight to three weeks before hay time.

7. *Would it be advisable to bind cereals with a view to it packing closer, and also, for convenience in handling?*

Whilst you can fill the pit with long ensilage, preferably in bound sheaves, the most effective method, and the one which will enable you to store the maximum in the pit, would be to chaff it straight out of the field into the pit. Do not cut the bands, because you will be enabled to empty the pit far more readily in the sheaves than you would with long, tangled hay.

8. *Could a layer of artichokes be put in now and then, or would the bitterness affect the whole mass?*

Although I have no personal experience of the matter I believe that the artichoke will make very fair ensilage, particularly if mixed with cereals.

9. *What quantity of silage constitutes a fair ration for a milking cow?*



The following is a ration for dairy cattle, according to the milk supplied, and per 1,000lbs. live weight:—

|                           | Per Day—        |                 |                 |                 |
|---------------------------|-----------------|-----------------|-----------------|-----------------|
|                           | 10lbs.<br>Milk. | 20lbs.<br>Milk. | 30lbs.<br>Milk. | 40lbs.<br>Milk. |
| Cereal ensilage . . . . . | 42              | 42              | 45              | 45              |
| Wheat-hay-chaff . . . . . | 10              | 10              | 10              | 6               |
| Bran . . . . .            | 3½              | 10              | 15              | 20              |

If you feed ensilage alone, 60lbs. to 80lbs. of ensilage per day.

10. *The comparative weights of silage and hay?*

If you make ensilage well you should not lose more than 10 per cent. of the weight. If you let it get dark, up to 15 per cent. to 20 per cent. The loss of weight for hay in the field was found at Roseworthy College to be about 40 per cent. of the original green weight.

11. *Would stone be suitable for weighting, and what quantity would be required?*

Any convenient material will act as a weight, but as it is necessary to distribute this weight uniformly over the whole surface it is preferable to cover the top of your pit with stout planks and place the weights on top of them—the weight to be not less than 1ewt. per square foot of surface.

*A Few Hints on Ensilage Making.*

As much as possible fill in everything you cut in the course of the day. Do not leave anything over; turn it straight in as quickly as possible.

Whilst you are filling, have the person in the pit continually pressing it down, particularly on the sides, to keep it well packed on the edges.

It does not matter if it rains, providing it does not prevent carting. Rain water will not do any harm.

Fill to about 3ft. or 4ft. above the top. You will find that it will sink, and you can then resume and fill up again. Generally speaking, the heat that is generating at that time will keep mould off. (At Roseworthy Agricultural College a pit 14ft. deep was filled to 2ft. above the top, making 16ft. of vertical measurement. Two days after filling it was found that it had fallen 1½ft. below the walls—a fall of 3½ft.) Therefore, top it up at least once.

Failures are caused by leaving the green stuff out drying. Do not cut more than can be put in in one day; fill in each day and keep tramping it down.

It is an advantage to sprinkle a little salt now and again.

## **EVERY MAN SHOULD MAKE A WILL.**

**FAILURE TO MAKE A WILL** is seldom deliberate. In the majority of cases, men who die intestate have always intended to make a will, but thoughtlessness, forgetfulness, or a reluctance to be directly concerned with a matter that touches the inevitable end of life, have caused them to defer the matter.

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## WHITE GRUBS.

[By J. DAVIDSON, D.Sc., F.E.S., Waite Agricultural Research Institute, University of Adelaide.]

During the past few weeks several inquiries have been made regarding underground grubs causing damage to pastures and cereals in the South-East area, and to strawberry plants in the Adelaide hills. In every case where specimens were submitted the grubs proved to be the larvae of beetles of the family *Scarabacidae*, which are widely known as "white grubs," the adults being often referred to as cockchafers. The grubs of a number of species of this family are serious root-feeding pests of pasture grasses and allied crops in many countries. Owing to their underground habits their control by practical economic measures is a problem of great difficulty where the infested areas are large.

The destructive species of the family belong chiefly to the group Melonthides, of which the common cockchafer grubs of pastures are well known examples. The sugar cane in Queensland is subject to severe attacks by the larvae of certain species, particularly those of the large chafer (*Lepidoderma albobirtum*). There are hundreds of species of this group in South Australia. The larvae of the different species closely resemble one another in general appearance, and in the present state of our knowledge of the young stages of these insects it is not possible to identify the species concerned from the larval stage only.

The adult beetles vary in size with different species, but they are usually relatively thick-set insects and are readily recognised by the appearance of the antennae. Certain of the segments are flattened and folded in layers, thus forming a conspicuous lamellated club at the end of each antenna. In some cases the beetles may occur in swarms in early summer when they emerge from the pupal cases in the soil. They are night feeders on foliage, and sometimes attack vines and foliage of orchard trees, doing considerable damage. An instance of this kind occurred in the Angaston district in October, 1929, when a species of *Heteronyx* occurred in swarms on a local area of young vines and caused much damage. During the day time the beetles remain in hiding in loose soil or similar situations. The species most frequently met with in South Australia belong to the genera *Heteronyx*, *Diphucephala*, *Scitata*, and *Anodontonyx*. Fortunately many of them appear to confine their feeding habits to native vegetation.

### LIFE HISTORY.

The general features of the life cycle of cockchafer beetles may be briefly outlined as follows:—

The females lay eggs below the surface of the soil in suitable ground in early summer. Some species prefer pasture areas and "white grubs" are likely to be present in grass land broken up for cropping. The young grubs hatch out in about a fortnight, and feed on the roots of suitable plants working from one inch to a few inches below the surface of the soil. The length of time taken for the grubs to attain full development varies considerably with different species. With some species it is about 10 months, but with others it may be two years or more. During this period the grubs are actively at work on the roots of plants, but during the winter period they work deeper into the soil and do not feed so actively. The damage to the crop becomes more evident in spring as the grubs are larger and more active. When the grubs are fully developed they go into a resting pupal stage from which the adult beetles emerge usually in early summer.

The grubs or larvae (Fig. 1) have a characteristic appearance. They are relatively stout with a long, wrinkled body of a whitish or yellowish-white color. When disturbed they curl up into a crescent shape, the end of the body being swollen and dark owing



to the dark contents of the hind intestine. They appear sluggish, but by means of the strong three pairs of legs they can readily work their way through the soil. The head is hard and they have strong biting mouth parts.

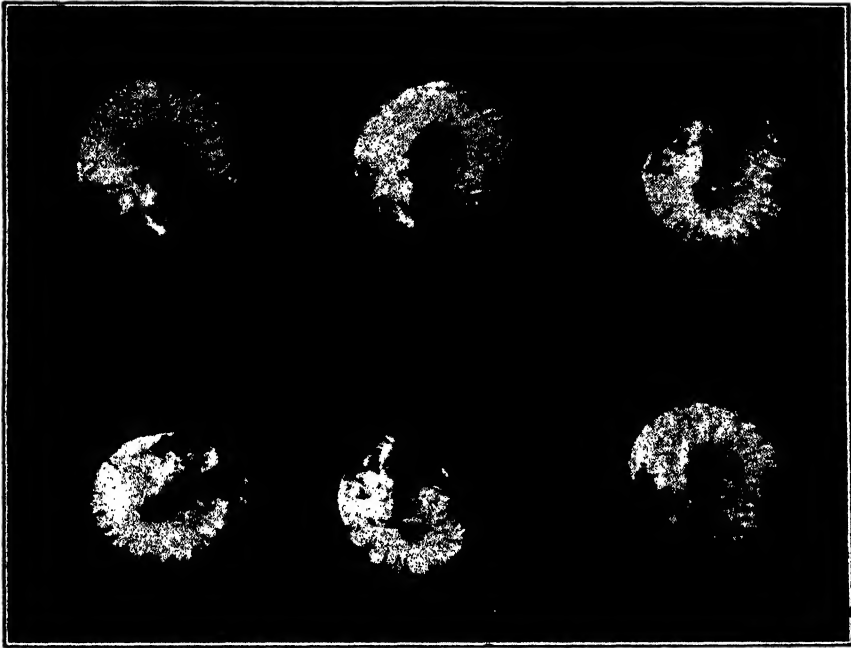


Fig. 1.

#### CROPS ATTACKED AND NATURE OF DAMAGE DONE.

While the damage due to white grubs appears more frequently in lawns and pastures, the roots of wheat, oats, potatoes, beans, and strawberries may be attacked. Where present in lawns and pastures the grass in local patches is checked in growth and begins to turn brown and dies. On examination of the soil in these areas to a depth of a few inches the grubs will be found and the roots of the grasses soon to be eaten away. With young cereal crops plants attacked become stunted in growth, usually showing in patches, and eventually die. It will be found that the roots of the plants have been eaten away by the grubs as shown in Fig. 2, which is a photograph of wheat plants attacked by white grubs in Yorke Peninsula, September 20th, 1929. The two plants on the left have not been attacked.

#### NATURAL ENEMIES.

Magpies and crows eat white grubs. Flower wasps (Fam. *Thynnidae*) and Hairy flower wasps (Fam. *Scoliidae*) are valuable insect enemies of these grubs. The female wasp burrows into the ground and when it finds a grub it stings it into insensibility and lays its eggs on it. The young wasp larva which hatches from the egg feeds on the paralysed beetle grub.

#### CONTROL MEASURES.

The control of white grubs is a difficult problem and it is not yet possible to recommend an efficient economic method for dealing with them in a practical manner over large areas. The occurrence of the grubs may be more marked in a crop following grass. Vigorous cultivation will result in the grubs and pupae being exposed to their natural enemies and many of them being killed. A clean fallow will help to starve out the grubs, and the female beetles will not normally select a clean fallow in which



to lay their eggs. If crop rotation is practicable, trials might be made with suitable crops less affected by the grubs. Where small areas in a pasture or cereal crop are found to be infested, measures should be taken to prevent the spread of the damage by destroying the grubs in those areas. A simple method which has given some success in pastures is to roll the infested areas with a very heavy roller when the ground is suitably soft. Many of the grubs will be killed in this way. In a cereal crop the

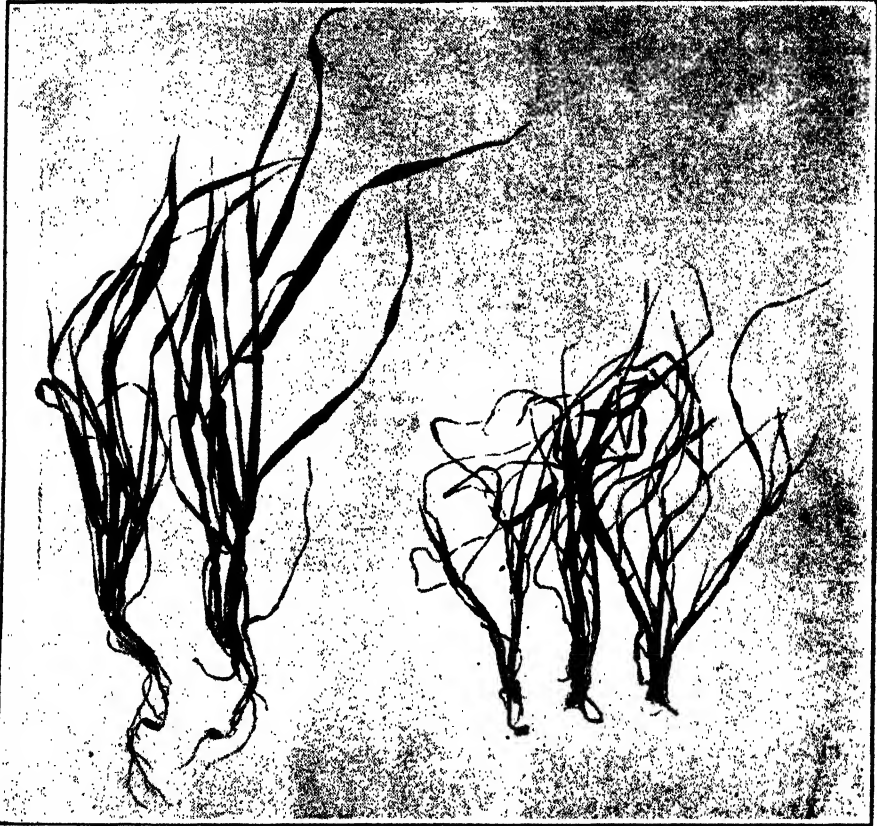


Fig. 2.

soil of small infested areas may be treated with a soil fumigant. This method may also be used in the case of white grubs attacking garden crops. The method is, however, too costly for use on large areas. Commercial naphthalene, calcium cyanide, and carbon-di-sulphide are generally used. It should be noted that these fumigants are toxic to the roots of the plants, and about a fortnight should elapse after treatment before the area is planted. Where a growing crop is being treated calcium cyanide should not be used. The two other substances referred to are not so toxic as the cyanide, but care should be taken not to place the substances too near the roots of the plants.

Commercial naphthalene is the most convenient substance to use. Its efficiency will depend on the condition of the soil and the amount applied. It should be worked into the soil to a depth of a few inches at the rate of 2ozs. to 4ozs. per square yard. The best results will be obtained when the soil is not too dry. Naphthalene acts as a repellent against soil insects, and while the lighter application of the substance may not kill the grubs it will repel the adult beetles from laying their eggs in the treated soil.



Calcium cyanide may be applied in granular form at the rate of 2ozs. per square yard and worked into the soil to the depth of a few inches. It must be noted that calcium cyanide is very toxic to the roots of plants. It is extremely poisonous to human beings and animals, and must be handled with the greatest care.

Carbon-di-sulphide is a useful soil fumigant and is less toxic to plants than cyanide. It is a highly inflammable liquid, and great care must be taken in using it; and it must not be kept in a warm place. For treatment of root feeding insects it is usually applied by injecting a definite quantity of the liquid into holes in the ground near the plants by means of an "injector" apparatus designed for the purpose. The holes are spaced about 2ft. apart, and the liquid injected to the desired depth. The substance then diffuses through the soil. For the treatment of white grubs this method would be tedious if a comparatively large surface is to be dealt with.

Experimental work in the United States against grubs of the Asiatic beetle (*Anomala orientalis*) infesting lawns has shown that carbon-di-sulphide made up in the form of an emulsion is an efficient fumigant for this purposes. When an emulsion containing 70 per cent. carbon-di-sulphide was diluted 200 times with water and applied at the rate of 3 pints of the diluted emulsion to each square foot of surface, a high percentage of the grubs was killed.

Promising results have also been obtained by top-dressing grub-infested lawns with lead arsenate. Five pounds of lead arsenate mixed with 1bush. of screened soil is applied per 1,000 sq. ft. of area. This method cannot, of course, be applied to pastures on which stock are being fed. Moreover, further research seems necessary to show the influence of arsenic in the soil on plant growth.

It is interesting to note that the Asiatic beetle in Hawaii was controlled by the introduction of a Scoliid wasp (*Scolia manilae*). Until the various species of white grubs which are causing losses in the different areas of South Australia have been investigated, one cannot say what methods of biological control can be applied. The species of beetles concerned appear to be native species, so that one cannot say at present what success can be expected on these lines.

As regards the adult beetles, which are night feeders, when they appear in numbers on orchard trees or vines, a simple mechanical method of jarring the branches so as to shake the beetles into trays of corrugated iron or canvas sheets smeared with tar and kerosine, is useful. Spraying with lead arsenate at the rate of 6lbs. to 100galls. water, to which 1gall. of molasses has been added, will check the damage, but sometimes the beetles are not readily killed with arsenic sprays.

## CLEARING THAT SCRUB.

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## KYBYBOLITE EXPERIMENTAL FARM.

### REPORT ON FARM CROPS, 1929-30.

[By L. J. Cook, R.D.A., Manager.]

#### THE SEASON.

Agriculturally the season 1929 was a good one in most respects. Weather conditions during most of the season were very suitable to our soils, and practically all crops were sown under really good soil tilth, and maintained continuous healthy growth throughout the winter and early spring. A shortage of late spring and early summer rains, however, caused a poor development of spring-sown crops, and somewhat adversely affected the ripening of autumn-sown crops. Seeding rains were above the average, commenced early in April, and were well distributed throughout April and May. Winter rains were slightly in excess of the average, but were not sufficient at any time to cause over saturation of the soil, and consequently plants received no check in their winter growth. The spring falls were 2ins. less than usual, but were comparatively well distributed, thereby alleviating any bad effects that might have been expected from the reduced rainfall. The early summer rains were also  $\frac{1}{2}$ in. less than the average, and this caused a reduced yield of crops, especially amongst spring-sown cereals and peas.

The following table shows the yields of crops received for the season, in comparison with the mean yields secured since such crops have been under cultivation at Kybybolite:—

TABLE 1.—*Crop Returns for Season 1929-30, Compared with Mean Yields.*

| Crop.            | Period. | Mean Yield. | Average Yield,<br>1929. |
|------------------|---------|-------------|-------------------------|
|                  |         | Bush. lbs.  | Bush. lbs.              |
| Wheat .....      | 1910-29 | 14 47       | 15 24                   |
| Oats .....       | 1910-29 | 19 35       | 10 18                   |
| Barley .....     | 1910-29 | 13 1        | 7 48                    |
| Rye .....        | 1914-29 | 6 49        | 1 52                    |
| Peas .....       | 1921-29 | 11 50       | 4 59                    |
|                  |         | T. C. L.    | T. C. L.                |
| Cereal Hay ..... | 1910-29 | 1 6 66      | 1 7 100                 |
| Ensilage .....   | 1920-29 | 4 2 106     | 6 5 46                  |
| Meadow Hay ..... | 1926-29 | 1 14 82     | 1 15 81                 |

The above table shows that all autumn-sown crops, with the exception of oats, returned yields above the average. Ensilage crops yielded considerably better than the mean yield, whilst meadow and cereal hays yielded a little above the usual. With grains wheat exceeded the mean yield slightly, whilst the result secured from oats was exceptionally low. This was due to rough and unsettled weather experienced immediately before harvest. Crops were rank, and rough weather caused them to be badly lodged, and a large percentage of the grain to shatter. The spring-sown crops, barley, rye, and peas, did not develop well, and yields were disappointing.



The following table sets out the rainfall received at the Farm since 1906:—

TABLE 2.—*Rainfall Distribution at Kybybolite, 1906-1929.*

|                                      | Means,<br>1906-15. | Means,<br>1916-25. | 1926. | 1927. | 1928. | 1929. | Means,<br>1906-29. |
|--------------------------------------|--------------------|--------------------|-------|-------|-------|-------|--------------------|
|                                      | In.                | In.                | In.   | In.   | In.   | In.   | In.                |
| January .....                        | 0.37               | 0.56               | 0.01  | 0.51  | 1.59  | 1.35  | 0.53               |
| February .....                       | 0.93               | 1.10               | 0.43  | 1.20  | 1.74  | 0.22  | 1.00               |
| March .....                          | 1.53               | 0.57               | 0.06  | 0.96  | 0.55  | 0.65  | 0.97               |
| April .....                          | 1.50               | 0.83               | 2.10  | 0.20  | 1.50  | 3.12  | 1.26               |
| May .....                            | 2.52               | 2.61               | 3.17  | 2.92  | 2.24  | 2.16  | 2.57               |
| June .....                           | 3.14               | 2.83               | 1.24  | 1.63  | 2.53  | 3.32  | 2.85               |
| July .....                           | 3.13               | 2.71               | 2.71  | 2.14  | 2.71  | 3.08  | 2.88               |
| August .....                         | 2.67               | 2.61               | 3.31  | 4.02  | 0.90  | 1.84  | 2.62               |
| September .....                      | 2.96               | 2.69               | 1.79  | 0.91  | 3.12  | 1.75  | 2.67               |
| October .....                        | 1.80               | 1.92               | 2.27  | 0.52  | 4.47  | 1.50  | 1.91               |
| November .....                       | 1.55               | 1.51               | 0.68  | 2.06  | 0.99  | 0.97  | 1.47               |
| December .....                       | 1.21               | 1.10               | 0.83  | 1.31  | 0.17  | 1.66  | 1.13               |
| Total rainfall .....                 | 23.31              | 21.04              | 18.60 | 18.38 | 22.51 | 21.62 | 21.86              |
| Total "Useful" rain, April-Nov. .... | 19.27              | 17.71              | 17.27 | 14.40 | 18.46 | 17.74 | 18.23              |

The total rainfall of 21.62ins. for the year is approximately the average received during the past 24 years, and except for the light spring rains the distribution was good.

TABLE 3.—*Distribution of "Useful Rain," Kybybolite, 1929.*

|                                  | Means,<br>1906-15. | Means,<br>1916-25. | 1926. | 1927. | 1928. | 1929. | Means,<br>1906-29. |
|----------------------------------|--------------------|--------------------|-------|-------|-------|-------|--------------------|
|                                  | In.                | In.                | In.   | In.   | In.   | In.   | In.                |
| Seeding rains (April-May) .....  | 4.02               | 3.44               | 5.27  | 3.12  | 3.74  | 5.28  | 3.83               |
| Winter rains (June-July) .....   | 6.27               | 5.54               | 3.95  | 3.77  | 5.24  | 6.40  | 5.73               |
| Spring rains (August-October) .. | 7.43               | 7.22               | 7.37  | 5.45  | 8.49  | 5.09  | 7.20               |
| Early Summer rains (November) .. | 1.55               | 1.51               | 0.68  | 2.06  | 0.99  | 0.97  | 1.47               |
| Total "Useful" rain .....        | 19.27              | 17.71              | 17.27 | 14.40 | 18.46 | 17.74 | 18.23              |

#### CROPS.

On account of the much-improved pasture of the Farm, the increasing of the grazing livestock, and a reduction of manual labor, the area sown to crops was further reduced. One hundred and twenty-eight acres were sown to cereals and peas on the area set apart for testing various rotational systems of cropping. The usual area was devoted to turnips for winter grazing, whilst the main fields of the Farm, outside the experimental areas, were top dressed. Approximately half the Farm is now sown to Subterranean Clover and Wimmera Rye Grass pasture.

#### TURNIPS.

As usual, three fields sown to Mammoth purple-top turnips during the spring of 1928 were grazed in the winter months of 1929. The crops germinated well and made a good stand. The summer rains of 1928 and autumn showers of 1929 were sufficient to maintain the crops, and the good April falls caused a very good development of roots by June. The fields were grazed in the usual way, without hurdling, and carried the equivalent of 2.54 sheep per acre per annum, or approximately 30 sheep per acre for one month during mid-winter. The result is slightly better than the mean carrying capacity secured from turnip crops during the past eight seasons. The following tables show the grazing received from the various fields for 1929, and the feeding results secured from turnip crops for the past eight years.



TABLE 4.—*Turnip Grazing, Kybybolite, 1929.*

| Field.       | Area.<br>Acres. | Total<br>Feed Days. | Sheep Carried<br>per Acre per<br>Year. |
|--------------|-----------------|---------------------|----------------------------------------|
| No. 6f ..... | 10.81           | 10,095              | 2.56                                   |
| No. 9e ..... | 1.94            | 1,815               | 2.56                                   |
| No. 4a ..... | 5.28            | 4,837               | 2.51                                   |
| Total ....   | 18.03           | 16,747              | 2.54                                   |

TABLE 5.—*Feeding Results of Turnip Crops, Kybybolite, 1921-29.*

| Season.       | Area.<br>Acres. | Total<br>Feed Days. | Sheep per Acre<br>per Annum. |
|---------------|-----------------|---------------------|------------------------------|
| 1921-22 ..... | 15.59           | 12,848              | 2.26                         |
| 1922-23 ..... | 16.80           | 12,417              | 2.02                         |
| 1923-24 ..... | 16.40           | 23,520              | 3.88                         |
| 1924-25 ..... | 16.36           | 8,564               | 1.43                         |
| 1925-26 ..... | 15.19           | 9,218               | 1.66                         |
| 1926-27 ..... | 15.56           | 14,772              | 2.60                         |
| 1927-28 ..... | 16.70           | 17,960              | 2.95                         |
| 1928-29 ..... | 18.03           | 16,747              | 2.54                         |
| Total ....    | 130.63          | 116,046             | 2.43                         |

## ENSILAGE CROPS.

Cereal crops generally made bulky and thick growth, and consequently yields of ensilage were higher than usual. The bulk of ensilage was made from wheat crops that were following peas in the rotational tests.

The following tables show the returns of ensilage secured for 1929 from various fields, and also the returns for the past 10 seasons:—

TABLE 6.—*Ensilage Yields, Kybybolite, 1929.*

| Field.        | Area.<br>Acres. | Variety of Crop.        | Total Yield. |    |    | Yield<br>per Acre. |    |     |
|---------------|-----------------|-------------------------|--------------|----|----|--------------------|----|-----|
|               |                 |                         | T.           | C. | L. | T.                 | C. | L.  |
| No. 6D .....  | 1.63            | Wheat .....             | 14           | 10 | 84 | 8                  | 18 | 42  |
| No. 9c .....  | 1.08            | Oats .....              | 7            | 4  | 0  | 6                  | 13 | 37  |
| No. 4c .....  | 4.05            | Wheat .....             | 26           | 6  | 28 | 6                  | 9  | 105 |
| No. 9b .....  | 1.94            | Wheat .....             | 9            | 4  | 56 | 4                  | 15 | 12  |
| No. 20e ..... | 1.58            | Wheat (Headlands) ..... | 7            | 3  | 84 | 4                  | 10 | 110 |
| Total .....   | 10.28           |                         | 64           | 9  | 28 | 6                  | 5  | 46  |

TABLE 7.—*Ensilage Returns, Kybybolite, 1920-29.*

| Year.      | Total "Useful"   |                  | Area.<br>Acres. | Total Yield. |    |     | Yield<br>per Acre. |    |     |
|------------|------------------|------------------|-----------------|--------------|----|-----|--------------------|----|-----|
|            | Rainfall.<br>In. | Rainfall.<br>In. |                 | T.           | C. | L.  | T.                 | C. | L.  |
| 1920 ..... | 20.87            | 19.20            | 25.27           | 44           | 10 | 84  | 1                  | 15 | 28  |
| 1921 ..... | 22.49            | 18.53            | 19.01           | 85           | 8  | 70  | 4                  | 9  | 99  |
| 1922 ..... | 20.69            | 17.11            | 11.95           | 61           | 8  | 101 | 5                  | 2  | 94  |
| 1923 ..... | 25.67            | 23.22            | 31.60           | 84           | 8  | 98  | 2                  | 13 | 39  |
| 1924 ..... | 20.42            | 15.02            | 15.32           | 84           | 14 | 98  | 5                  | 10 | 71  |
| 1925 ..... | 16.08            | 14.02            | 13.29           | 67           | 10 | 14  | 5                  | 1  | 66  |
| 1926 ..... | 18.60            | 17.27            | 19.16           | 79           | 14 | 28  | 4                  | 3  | 23  |
| 1927 ..... | 18.38            | 14.40            | 17.61           | 69           | 9  | 84  | 3                  | 18 | 103 |
| 1928 ..... | 22.51            | 18.46            | 13.03           | 90           | 11 | 56  | 6                  | 19 | 3   |
| 1929 ..... | 21.62            | 17.24            | 10.28           | 64           | 9  | 28  | 6                  | 5  | 46  |
|            | 20.73            | 17.50            | 176.58          | 732          | 6  | 101 | 4                  | 2  | 106 |



## CEREAL HAY CROPS.

On account of the reduced area of cropping on the Farm, and also to the fact that Meadow Hay is now available as dry feed for the dairy herd, the requirements of cereal hay are much less. Consequently only 21 acres were this year cut for hay. Some useful yields were recorded from various fields, and are shown in accompanying tables:—

TABLE 8.—*Cereal Hay Yields, Kybybolite, 1929.*

| Field.        | Area.<br>Acres. | Variety of Crop.         | Total Yield. |    |    | Yield<br>per Acre. |    |     |
|---------------|-----------------|--------------------------|--------------|----|----|--------------------|----|-----|
|               |                 |                          | T.           | C. | L. | T.                 | C. | L.  |
| No. 11D ..... | 1.40            | Cape Barley .....        | 3            | 5  | 84 | 2                  | 6  | 108 |
| No. 9C .....  | 0.86            | Algerian Oats .....      | 1            | 18 | 0  | 2                  | 4  | 21  |
| No. 20D ..... | 1.58            | Algerian Oats .....      | 3            | 4  | 0  | 2                  | 0  | 57  |
| No. 6D .....  | 7.51            | Leak's Rust-proof Wheat. | 9            | 5  | 56 | 1                  | 4  | 78  |
| No. 16B ..... | 10.00           | Leak's Rust-proof Wheat. | 12           | 2  | 28 | 1                  | 4  | 25  |
| Total .....   | 21.35           |                          | 29           | 15 | 56 | 1                  | 7  | 100 |

TABLE 9.—*Cereal Hay Returns, Kybybolite, 1910-29.*

| Year.      | Total "Useful"   |                  | Area.<br>Acres. | Total Yield. |    |     | Yield<br>per Acre. |    |     |
|------------|------------------|------------------|-----------------|--------------|----|-----|--------------------|----|-----|
|            | Rainfall.<br>In. | Rainfall.<br>In. |                 | T.           | C. | L.  | T.                 | C. | L.  |
| 1910 ..... | 28.35            | 21.08            | 106.13          | 88           | 19 | 28  | 0                  | 16 | 85  |
| 1911 ..... | 22.23            | 14.72            | 94.04           | 136          | 6  | 110 | 1                  | 9  | 28  |
| 1912 ..... | 20.83            | 18.23            | 26.29           | 67           | 7  | 70  | 2                  | 10 | 76  |
| 1913 ..... | 18.44            | 13.93            | 108.55          | 166          | 11 | 0   | 1                  | 10 | 77  |
| 1914 ..... | 11.94            | 8.43             | 109.00          | 90           | 1  | 0   | 0                  | 16 | 59  |
| 1915 ..... | 23.30            | 21.18            | 108.66          | 111          | 14 | 56  | 1                  | 0  | 65  |
| 1916 ..... | 23.53            | 20.19            | 77.35           | 135          | 1  | 0   | 1                  | 14 | 102 |
| 1917 ..... | 26.69            | 21.90            | 96.77           | 49           | 9  | 0   | 0                  | 10 | 25  |
| 1918 ..... | 18.32            | 16.44            | 152.85          | 172          | 1  | 70  | 1                  | 2  | 58  |
| 1919 ..... | 15.60            | 11.43            | 148.81          | 211          | 7  | 14  | 1                  | 8  | 45  |
| 1920 ..... | 20.87            | 19.20            | 66.05           | 56           | 5  | 28  | 0                  | 17 | 4   |
| 1921 ..... | 22.49            | 18.53            | 118.57          | 192          | 0  | 14  | 1                  | 12 | 43  |
| 1922 ..... | 20.69            | 17.11            | 85.88           | 143          | 13 | 14  | 1                  | 13 | 51  |
| 1923 ..... | 25.67            | 23.22            | 102.40          | 82           | 19 | 70  | 0                  | 16 | 23  |
| 1924 ..... | 20.42            | 15.02            | 132.93          | 287          | 15 | 42  | 2                  | 3  | 33  |
| 1925 ..... | 16.08            | 14.02            | 75.87           | 100          | 0  | 28  | 1                  | 6  | 41  |
| 1926 ..... | 18.60            | 17.27            | 59.19           | 93           | 18 | 28  | 1                  | 11 | 82  |
| 1927 ..... | 18.38            | 14.40            | 27.08           | 47           | 7  | 70  | 1                  | 14 | 111 |
| 1928 ..... | 22.51            | 18.46            | 25.14           | 54           | 15 | 0   | 2                  | 3  | 62  |
| 1929 ..... | 21.62            | 17.74            | 21.35           | 29           | 15 | 56  | 1                  | 7  | 100 |
| Means ..   | 20.83            | 17.12            | 1,742.91        | 2,317        | 9  | 26  | 1                  | 6  | 66  |

## MEADOW HAY.

The growth of Subterranean Clover and grass was good again this year, and as a large surplus was available in the pasture fields, a much greater quantity of this fodder was conserved as hay. The use of the improved push rake and hay press was secured, which enabled over 61 tons to be cut, cured, and pressed into bales. This meadow hay is proving particularly useful for feeding to the dairy herd during the colder months of the year, and when pressed into bales the handling of this bulky fodder is greatly economised. The following tables show the yields of meadow hay secured from various fields, together with the yields for the past four seasons from land fertilised with water soluble phosphates. Purely experimental areas have not been included:—

TABLE 10.—*Meadow Hay Yields, Kybybolite, 1929.*

| Field.               | Area.<br>Acres. | Variety of Crop.                    | Total Yield. |    |    | Yield<br>per Acre. |    |    |
|----------------------|-----------------|-------------------------------------|--------------|----|----|--------------------|----|----|
|                      |                 |                                     | T.           | C. | L. | T.                 | C. | L. |
| No. 18 (Centre) .... | 16.36           | Subterranean Clover ....            | 36           | 13 | 28 | 2                  | 4  | 92 |
| No. 18 (Western) ..  | 8.40            | Subterranean Clover ....            | 12           | 12 | 28 | 1                  | 10 | 3  |
| No. 6B .....         | 9.57            | Subterranean and Crimson<br>Clovers | 12           | 1  | 0  | 1                  | 5  | 20 |
| Total .....          | 34.33           |                                     | 61           | 6  | 56 | 1                  | 15 | 81 |



TABLE 11.—*Meadow Hay Returns, Kybybolite, 1926-29.*

| Year.      | Total "Useful" |           | Area.  | Total Yield. |    |    | Yield per Acre. |    |    |
|------------|----------------|-----------|--------|--------------|----|----|-----------------|----|----|
|            | Rainfall.      | Rainfall. |        | T.           | C. | L. | T.              | C. | L. |
|            | In.            | In.       | Acres. |              |    |    |                 |    |    |
| 1926 ..... | 18-60          | 17-27     | 1-66   | 4            | 2  | 70 | 2               | 9  | 87 |
| 1927 ..... | 18-38          | 14-40     | 6-64   | 5            | 7  | 0  | 0               | 16 | 13 |
| 1928 ..... | 22-51          | 18-46     | 18-71  | 35           | 14 | 28 | 1               | 18 | 20 |
| 1929 ..... | 21-62          | 17-74     | 34-33  | 61           | 6  | 56 | 1               | 15 | 81 |
| Means .... | 20-28          | 16-97     | 61-34  | 106          | 10 | 42 | 1               | 14 | 82 |

With reference to Table 10, it should be noted that the western section of Field No. 18 was mown three weeks later than the centre section, and consequently the weight of hay secured was considerably lighter, although there was little noticeable difference in the two stands of pasture. Also Field No. 6B contained 7½ acres of a good stand of Subterranean clover, and 2 acres of only a medium stand of crimson and natural clovers. The yield of approximately 2½ tons per acre from the centre section of Field No. 18 is particularly satisfactory, especially as this same area returned a yield of 38cwts. per acre the previous season, 1928.

For the four seasons, 1926-29, it is interesting to note that the average yield of cereal hay secured on the Farm has been 1 ton 14cwts. 2lbs. per acre, as against 1 ton 14cwts. 82lbs. per acre received from meadow hay.

#### OAT CROPS.

Forty-four acres were sown to oats in the various rotation tests with the Algerian variety. On account of the reduction of staff the growing and testing varieties of oats has had to be discontinued. The crops made good growth, and promised to yield well. With the exception of one small field, and headlands, 40 acres were left for harvesting for grain.

Unfortunately rough weather occurred immediately before oats were sufficiently ripe for harvesting and caused considerable loss of grain through heavy lodging of crops, and subsequent shattering of grain. Especially was this the case in Field No. 20B, which had been under clover pasture for three seasons, and grew a particularly heavy and bulky crop. The stubbles were heavily stocked, and carried the equivalent of 5 sheep per acre for the first three months of 1930.

The following table sets out the returns received from oat crops since 1910:—

TABLE 12.—*Oat Returns, Kybybolite, 1910-29.*

| Year.      | Total "Useful" |           | Area.    | Total Yield. |    |  | Yield per Acre. |    |  |
|------------|----------------|-----------|----------|--------------|----|--|-----------------|----|--|
|            | Rainfall.      | Rainfall. |          | B.           | L. |  | B.              | L. |  |
|            | In.            | In.       | Acres.   |              |    |  |                 |    |  |
| 1910 ..... | 28-35          | 21-08     | 77-00    | 1,001        | 0  |  | 13              | 0  |  |
| 1911 ..... | 22-23          | 14-72     | 60-91    | 828          | 13 |  | 13              | 24 |  |
| 1912 ..... | 20-83          | 18-23     | 103-00   | 3,450        | 36 |  | 33              | 20 |  |
| 1913 ..... | 18-44          | 13-93     | 94-55    | 1,460        | 10 |  | 15              | 18 |  |
| 1914 ..... | 11-94          | 8-43      | 6-00     | 61           | 3  |  | 10              | 7  |  |
| 1915 ..... | 23-30          | 21-18     | 79-74    | 1,251        | 25 |  | 15              | 28 |  |
| 1916 ..... | 23-53          | 20-19     | 61-94    | 1,388        | 39 |  | 22              | 17 |  |
| 1917 ..... | 26-69          | 21-90     | 20-66    | 154          | 13 |  | 7               | 19 |  |
| 1918 ..... | 18-32          | 16-44     | 36-93    | 554          | 25 |  | 15              | 1  |  |
| 1919 ..... | 15-60          | 11-43     | 50-77    | 1,144        | 34 |  | 22              | 22 |  |
| 1920 ..... | 20-87          | 19-20     | 36-29    | 613          | 1  |  | 16              | 36 |  |
| 1921 ..... | 22-49          | 18-53     | 52-82    | 708          | 39 |  | 13              | 17 |  |
| 1922 ..... | 20-69          | 17-11     | 86-40    | 1,611        | 31 |  | 18              | 26 |  |
| 1923 ..... | 25-67          | 23-22     | 35-34    | 228          | 22 |  | 6               | 19 |  |
| 1924 ..... | 20-42          | 15-02     | 89-38    | 2,464        | 14 |  | 27              | 23 |  |
| 1925 ..... | 16-08          | 14-02     | 64-08    | 1,211        | 32 |  | 18              | 36 |  |
| 1926 ..... | 18-60          | 17-27     | 57-01    | 1,198        | 34 |  | 21              | 1  |  |
| 1927 ..... | 18-38          | 14-40     | 57-41    | 1,744        | 30 |  | 30              | 16 |  |
| 1928 ..... | 22-51          | 18-46     | 54-53    | 1,660        | 35 |  | 30              | 18 |  |
| 1929 ..... | 21-62          | 17-74     | 40-11    | 419          | 10 |  | 10              | 18 |  |
|            | 20-83          | 17-12     | 1,164-87 | 23,158       | 6  |  | 19              | 35 |  |



## BARLEY CROPS.

Cape barley was sown in the three fields in the springtime in the various rotations, following the grazing of turnips. Seeding was done in August under good soil tilth and weather conditions, but a rather heavy rain fell a few days after seeding, causing a fair percentage of the grain to rot. On account of the shortness of the season, the thin crops failed to stool or develop well, and unsatisfactory yields were recorded. This is the poorest result received from barley since this crop has been grown in systematic rotation following the good, cleaning root crop, turnips.

The average yield of barley for the past eight seasons, since this system has been in operation, has been 22bush. 18lbs. per acre, in comparison with the general average return of 13bush. 11lb. per acre.

The following table shows the returns of barley received since 1910:—

TABLE 13.—*Barley Returns, Kybybolite, 1910-29.*

| Year.      | Total Rainfall. | Useful Rainfall. | Area. Acres. | Total Yield. |    | Yield per Acre. |    |                  |
|------------|-----------------|------------------|--------------|--------------|----|-----------------|----|------------------|
|            | In.             | In.              |              | B.           | L. | B.              | L. |                  |
| 1910 ..... | 28-35           | 21-08            | 45-39        | 299          | 29 | 6               | 30 | } B. L.<br>11 10 |
| 1911 ..... | 22-23           | 14-72            | 58-76        | 552          | 16 | 9               | 20 |                  |
| 1912 ..... | 20-83           | 18-23            | 50-00        | 1,500        | 0  | 30              | 0  |                  |
| 1913 ..... | 18-44           | 13-93            | 35-00        | 527          | 0  | 15              | 3  |                  |
| 1914 ..... | 11-94           | 8-43             | 3-02         | 37           | 48 | 12              | 29 |                  |
| 1915 ..... | 23-30           | 21-18            | 50-28        | 789          | 39 | 15              | 35 |                  |
| 1916 ..... | 23-53           | 20-19            | 43-24        | 273          | 37 | 7               | 17 |                  |
| 1917 ..... | 26-69           | 21-90            | 66-31        | 304          | 41 | 4               | 30 |                  |
| 1918 ..... | 18-32           | 16-44            | 35-08        | 266          | 48 | 7               | 31 |                  |
| 1919 ..... | 15-60           | 11-43            | 39-71        | 655          | 1  | 16              | 25 |                  |
| 1920 ..... | 20-87           | 19-20            | 55-77        | 474          | 7  | 8               | 25 | } B. L.<br>22 18 |
| 1921 ..... | 22-49           | 18-53            | 54-56        | 339          | 22 | 6               | 11 |                  |
| 1922 ..... | 20-60           | 17-11            | 10-78        | 196          | 42 | 18              | 13 |                  |
| 1923 ..... | 25-67           | 23-22            | 12-75        | 173          | 22 | 13              | 30 |                  |
| 1924 ..... | 20-42           | 15-02            | 16-40        | 400          | 49 | 24              | 22 |                  |
| 1925 ..... | 16-08           | 14-02            | 12-82        | 265          | 19 | 20              | 35 |                  |
| 1926 ..... | 18-60           | 17-27            | 11-38        | 363          | 23 | 31              | 47 |                  |
| 1927 ..... | 18-38           | 14-40            | 11-15        | 313          | 38 | 28              | 7  |                  |
| 1928 ..... | 22-51           | 18-46            | 13-78        | 489          | 46 | 35              | 28 |                  |
| 1929 ..... | 21-62           | 17-74            | 14-74        | 117          | 21 | 7               | 48 |                  |
|            | 20-83           | 17-12            | 640-92       | 8,341        | 48 | 13              | 1  |                  |

## WHEAT CROPS.

Twenty-six acres of wheat were harvested for grain, and all, with the exception of 1 acre of spring sown, was grown in Field No. 20E following three seasons of clover pasture. The wheats made really good growth, developing into tall, bulky crops, which yielded heavily in straw, but somewhat disappointing in grain. Of the seven varieties grown, Sultan yielded best with 20bush. per acre, followed by Leak's Rust Proof and Federation with 18bush. and 17½bush. respectively.

The following table shows the returns received from the various varieties:—

TABLE 14.—*Wheat Fields, Kybybolite, 1929.*

| Variety.                   | Field Grown. | Area. Acres. | Total Yield. |    | Yield per Acre. |    |
|----------------------------|--------------|--------------|--------------|----|-----------------|----|
|                            |              |              | B.           | L. | B.              | L. |
| Sultan .....               | No. 20E      | 2-43         | 48           | 33 | 19              | 59 |
| Leak's Rust Proof .....    | "            | 11-04        | 199          | 19 | 18              | 3  |
| Federation .....           | "            | 1-64         | 28           | 41 | 17              | 29 |
| White Tuscan .....         | "            | 1-84         | 29           | 47 | 16              | 11 |
| White Essex .....          | "            | 1-84         | 24           | 31 | 13              | 19 |
| Queen Fan .....            | "            | 4-28         | 49           | 40 | 11              | 36 |
| Gluyas (Spring sown) ..... | "            | 1-87         | 15           | 32 | 8               | 18 |
| Gluyas (Spring sown) ..... | No. 6F       | 1-05         | 4            | 6  | 3               | 54 |
|                            |              | 25-99        | 400          | 9  | 15              | 24 |



The next table shows the wheat returns for the Farm since 1910:—

TABLE 15.—*Wheat Returns, Kybybolite, 1910-29.*

| Year.      | Total<br>Rainfall.<br>In. | " Useful "<br>Rainfall.<br>In. | Area.<br>Acres. | Total<br>Yield.<br>Bush. lbs. | Yield per<br>Acre.<br>Bush. lbs. |
|------------|---------------------------|--------------------------------|-----------------|-------------------------------|----------------------------------|
| 1910 ..... | 28.35                     | 21.08                          | 15.00           | 79 43                         | 5 19                             |
| 1911 ..... | 22.23                     | 14.72                          | 17.15           | 232 45                        | 13 34                            |
| 1912 ..... | 20.83                     | 18.23                          | 81.91           | 1,876 35                      | 22 54                            |
| 1913 ..... | 18.44                     | 13.93                          | 48.20           | 1,288 56                      | 26 44                            |
| 1914 ..... | 11.94                     | 8.43                           | 22.17           | 238 32                        | 10 46                            |
| 1915 ..... | 23.30                     | 21.18                          | 79.64           | 882 31                        | 11 5                             |
| 1916 ..... | 23.53                     | 20.19                          | 98.75           | 1,875 19                      | 18 59                            |
| 1917 ..... | 26.69                     | 21.90                          | 70.46           | 231 29                        | 3 17                             |
| 1918 ..... | 18.32                     | 16.44                          | 58.52           | 1,027 40                      | 17 34                            |
| 1919 ..... | 15.60                     | 11.43                          | 78.26           | 1,190 50                      | 15 13                            |
| 1920 ..... | 20.87                     | 19.20                          | 73.37           | 812 8                         | 11 4                             |
| 1921 ..... | 22.49                     | 18.53                          | 125.24          | 1,548 54                      | 12 22                            |
| 1922 ..... | 20.69                     | 17.11                          | 61.73           | 872 38                        | 14 8                             |
| 1923 ..... | 25.67                     | 23.22                          | 7.72            | 32 43                         | 4 14                             |
| 1924 ..... | 20.42                     | 15.02                          | 28.92           | 454 36                        | 15 43                            |
| 1925 ..... | 16.08                     | 14.02                          | 10.75           | 157 12                        | 14 37                            |
| 1926 ..... | 18.60                     | 17.27                          | 38.21           | 529 6                         | 13 51                            |
| 1927 ..... | 18.38                     | 14.40                          | 56.26           | 1,102 38                      | 19 36                            |
| 1928 ..... | 22.51                     | 18.46                          | 44.29           | 573 33                        | 12 57                            |
| 1929 ..... | 21.62                     | 17.74                          | 25.99           | 400 9                         | 15 24                            |
|            | 20.83                     | 17.12                          | 1,042.54        | 15,407 57                     | 14 47                            |

#### RYE CROP.

A plot of rye was included amongst the spring-sown cereals in Field No. 6r. It suffered much worse than barley sown under similar conditions. The next table shows the yields of rye secured since 1914:—

TABLE 16.—*Rye Returns, Kybybolite, 1914-29.*

| Year.      | Total<br>Rainfall.<br>In. | " Useful "<br>Rainfall.<br>In. | Area.<br>Acres. | Total<br>Yield.<br>Bush. lbs. | Yield per<br>Acre.<br>Bush. lbs. |
|------------|---------------------------|--------------------------------|-----------------|-------------------------------|----------------------------------|
| 1914 ..... | 11.94                     | 8.43                           | 6.00            | 90 16                         | 15 3                             |
| 1915 ..... | 23.20                     | 21.18                          | 7.27            | 48 14                         | 6 38                             |
| 1916 ..... | 23.53                     | 20.19                          | 8.20            | 35 3                          | 4 16                             |
| 1917 ..... | 26.69                     | 21.90                          |                 | Failure                       |                                  |
| 1918 ..... | 18.32                     | 16.44                          | 4.62            | 52 0                          | 11 15                            |
| 1919 ..... | 15.60                     | 11.43                          | 7.23            | 37 7                          | 5 8                              |
| 1920 ..... | 20.87                     | 19.20                          | 14.71           | 47 48                         | 3 15                             |
| 1921 ..... | 22.49                     | 18.53                          | 10.44           | 74 44                         | 7 9                              |
| 1922 ..... | 20.69                     | 17.11                          | 4.09            | 24 50                         | 6 4                              |
| 1923 ..... | 25.67                     | 23.22                          | 2.90            | 3 9                           | 1 5                              |
| 1924 ..... |                           |                                | Not sown        |                               |                                  |
| 1925 ..... | 16.08                     | 14.02                          | 0.78            | 8 54                          | 11 28                            |
| 1926 ..... | 18.60                     | 17.27                          | 1.62            | 26 14                         | 16 12                            |
| 1927 ..... | 18.38                     | 14.40                          | 1.77            | 26 42                         | 15 5                             |
| 1928 ..... | 22.51                     | 18.46                          | 1.99            | 22 49                         | 11 28                            |
| 1929 ..... | 21.62                     | 17.74                          | 1.89            | 3 32                          | 1 52                             |
|            | 20.41                     | 17.30                          | 73.51           | 501 22                        | 6 49                             |

(In compiling above figures rye has been taken as weighing 60lbs. per bushel.)

#### PEA CROPS.

Peas were grown in two fields in the rotation series, but like the spring-sown cereals they suffered from the shortness of the season, and yields were unsatisfactory. The yields received are shown in the table following.



TABLE 17.—*Pea Yields, Kybybolite, 1929.*

| Variety.              | Field<br>Grown. | Area.<br>Acres. | Total<br>Yield.<br>Bush. lbs. | Yield per<br>Acre.<br>Bush. lbs. |
|-----------------------|-----------------|-----------------|-------------------------------|----------------------------------|
| Early Dun .....       | No. 4B          | 5.35            | 48 3                          | 8 59                             |
| " " .....             | No. 6C          | 4.07            | 14 58                         | 3 41                             |
| White Brunswick ..... | No. 6C          | 4.74            | 7 26                          | 1 34                             |
| —                     | —               | 14.16           | 70 27                         | 4 59                             |

The returns of peas for the past nine seasons are shown in Table 18:—

TABLE 18.—*Field Pea Returns, Kybybolite, 1921-29.*

| Year.      | Total<br>Rainfall.<br>In. | "Useful"<br>Rainfall.<br>In. | Area.<br>Acres. | Total<br>Yield.<br>Bush. lbs. | Yield per<br>Acre.<br>Bush. lbs. |
|------------|---------------------------|------------------------------|-----------------|-------------------------------|----------------------------------|
| 1921 ..... | 22.49                     | 18.53                        | 24.22           | 189 55                        | 7 50                             |
| 1922 ..... | 20.69                     | 17.11                        | 18.77           | 261 57                        | 13 57                            |
| 1923 ..... | 25.67                     | 23.22                        | 12.95           | 144 45                        | 11 11                            |
| 1924 ..... | 20.42                     | 15.02                        | 23.62           | 536 48                        | 22 44                            |
| 1925 ..... | 16.08                     | 14.02                        | 24.89           | 185 45                        | 7 28                             |
| 1926 ..... | 18.60                     | 17.27                        | 15.28           | 175 14                        | 11 28                            |
| 1927 ..... | 18.38                     | 14.40                        | —               | Failure                       | —                                |
| 1928 ..... | 22.51                     | 18.46                        | 13.08           | 174 27                        | 13 20                            |
| 1929 ..... | 21.62                     | 17.74                        | 14.16           | 70 27                         | 4 59                             |
|            | 20.50                     | 17.31                        | 146.97          | 1,739 18                      | 11 50                            |

The following table summarises generally the returns of the chief crops harvested for 1929, showing the average yield per acre, their values at current rates, also as stock food, as compared with hay at £3 per ton. The figures are based on tables prepared by the Director of Agriculture (Professor Arthur J. Perkins):—

TABLE 19.—*Value of Crops Harvested, Kybybolite, 1929.*

| Type of Crop. | Yield per<br>Acre. | Current<br>Market<br>Prices<br>per Ton. | Value at<br>Current<br>Rates<br>per Acre. | Value as<br>Stock Food<br>per Ton. | Value as<br>Stock Food<br>per Acre. |
|---------------|--------------------|-----------------------------------------|-------------------------------------------|------------------------------------|-------------------------------------|
|               | T. C. L.           | s. d.                                   | £ s. d.                                   | s. d.                              | £ s. d.                             |
| Ensilage ..   | 5 5 46             | 20 0                                    | 6 5 5                                     | 19 5                               | 6 1 9                               |
| Hay .....     | 1 7 100            | 70 0                                    | 4 17 2                                    | 60 0                               | 4 3 8                               |
|               | Bush. lbs.         | Per Bush.                               |                                           | Per Bush.                          |                                     |
| Barley .....  | 7 48               | 2 0                                     | 0 15 11                                   | 2 7                                | 1 0 7                               |
| Wheat .....   | 15 24              | 4 3                                     | 3 5 5                                     | 3 10                               | 2 19 0                              |
| Oats .....    | 10 18              | 2 3                                     | 1 3 6                                     | 2 1                                | 1 1 9                               |
| Peas .....    | 4 59               | 5 6                                     | 1 7 5                                     | 3 7                                | 0 17 10                             |

The following table shows the average annual value per acre of crops harvested at the Farm during the last nine seasons:—

TABLE 20.—*Value of Crops Harvested, Kybybolite, 1921-29.*

| Year.              | Ensilage.<br>£ s. d. | Hay.<br>£ s. d. | Peas.<br>£ s. d. | Wheat.<br>£ s. d. | Barley.<br>£ s. d. | Oats.<br>£ s. d. |
|--------------------|----------------------|-----------------|------------------|-------------------|--------------------|------------------|
| At current rates.— |                      |                 |                  |                   |                    |                  |
| 1921....           | 3 7 5                | 4 17 2          | 2 18 9           | 3 1 10            | 0 18 8             | 1 13 7           |
| 1922....           | 3 17 2               | 5 0 4           | 5 4 7            | 3 10 8            | 2 14 9             | 2 6 8            |
| 1923....           | 2 13 4               | 3 4 10          | 3 18 3           | 0 16 11           | 2 0 10             | 0 19 5           |
| 1924....           | 5 10 8               | 6 9 11          | 5 13 8           | 3 18 9            | 3 19 5             | 3 2 0            |
| 1925....           | 5 1 7                | 3 19 1          | 2 8 6            | 4 0 5             | 2 11 9             | 2 7 3            |
| 1926....           | 4 3 2                | 4 15 2          | 2 17 4           | 3 9 3             | 3 19 10            | 2 12 7           |
| 1927....           | 3 18 11              | 6 2 6           | —                | 4 9 10            | 5 0 10             | 5 6 5            |
| 1928....           | 6 19 0               | 7 12 5          | 3 6 8            | 2 15 0            | 4 8 11             | 3 0 11           |
| 1929....           | 6 5 5                | 4 17 7          | 1 7 5            | 3 5 5             | 0 15 11            | 1 3 6            |
| Means ..           | 4 13 0               | 5 4 4           | 3 9 5            | 3 5 4             | 2 19 0             | 2 10 3           |



TABLE 20.—*Value of Crops Harvested, Kybybovite, 1921-29—continued.*

| Year.          | Ensilage.<br>£ s. d. | Hay,<br>£ s. d. | Peas.<br>£ s. d. | Wheat.<br>£ s. d. | Barley.<br>£ s. d. | Oats.<br>£ s. d. |
|----------------|----------------------|-----------------|------------------|-------------------|--------------------|------------------|
| As stock food— |                      |                 |                  |                   |                    |                  |
| 1921....       | 4 7 3                | 4 17 2          | 1 8 1            | 2 7 5             | 0 16 1             | 1 8 0            |
| 1922....       | 4 19 10              | 5 0 4           | 2 10 0           | 2 14 2            | 2 7 2              | 1 18 10          |
| 1923....       | 2 11 9               | 2 8 7           | 2 0 1            | 0 16 3            | 1 15 2             | 0 13 6           |
| 1924....       | 5 7 5                | 6 9 11          | 4 1 5            | 3 0 3             | 3 3 2              | 2 17 5           |
| 1925....       | 4 18 8               | 3 19 1          | 1 6 9            | 2 16 0            | 2 13 6             | 1 19 4           |
| 1926....       | 4 0 9                | 4 15 2          | 2 1 1            | 2 13 1            | 4 2 6              | 2 3 10           |
| 1927....       | 3 16 8               | 5 5 0           | —                | 3 15 2            | 3 12 8             | 3 3 4            |
| 1928....       | 6 14 11              | 6 10 8          | 2 7 9            | 2 9 8             | 4 11 10            | 3 3 5            |
| 1929....       | 6 1 9                | 4 3 8           | 0 17 10          | 2 19 0            | 1 0 7              | 1 1 9            |
| Means ..       | 4 15 5               | 4 16 7          | 2 1 7            | 2 12 4            | 2 13 8             | 2 1 1            |

## EXPERIMENTS WITH VARIOUS SOIL CORRECTIVES.

Since 1925 Fields Nos. 16b and 16c have been utilised to test the use of Lime and Gypsum against High Grade 82 per cent. Rock Phosphate and Superphosphate in a two-course rotation of crops—peas and wheaten hay.

The pea crops were ploughed under as green manure during 1926 and 1927.

This season Subterranean Clover was sown with the wheat crop, and it has been decided to discontinue with the pea crop. Some of the plots have become badly infested with sorrel, which the clover should check, and at the same time interesting results should be obtained from the effect of lime and gypsum on the clover crop.

The following table shows the yields of wheaten hay secured for the past five seasons from the respective plots:—

TABLE 21.—*Experiments with Various Soil Correctives, 1925-29.*

| Plot. | Fertiliser per Acre.                      | Wheaten Hay Yield per Acre. |    |    |       |    |     |       |    |    |       |    |    |       |    |    |       |    |     |
|-------|-------------------------------------------|-----------------------------|----|----|-------|----|-----|-------|----|----|-------|----|----|-------|----|----|-------|----|-----|
|       |                                           | 1925.                       |    |    | 1926. |    |     | 1927. |    |    | 1928. |    |    | 1929. |    |    | Mean. |    |     |
|       |                                           | T                           | C  | L. | T     | C  | L.  | T     | C  | L. | T     | C  | L. | T     | C  | L. | T     | C  | L.  |
| 1.    | No manure . . . . .                       | 0                           | 14 | 21 | 0     | 14 | 63  | 1     | 2  | 56 | 1     | 9  | 14 | 0     | 17 | 42 | 0     | 19 | 62  |
| 2.    | 5cwt. Lime and 1cwt. 45% Super. . . . .   | 1                           | 15 | 70 | 1     | 0  | 7   | 1     | 13 | 28 | 2     | 0  | 42 | 1     | 12 | 84 | 1     | 12 | 46  |
| 3.    | 1cwt. 45% Super. . . . .                  | 1                           | 5  | 84 | 1     | 2  | 105 | 1     | 9  | 14 | 2     | 8  | 84 | 1     | 3  | 28 | 1     | 9  | 108 |
| 4.    | 1cwt. 82% Rock Phosphate . . . . .        | 0                           | 15 | 98 | 0     | 14 | 91  | 1     | 13 | 98 | 2     | 4  | 84 | 0     | 19 | 98 | 1     | 5  | 94  |
| 5.    | 5cwt. Gypsum and 1cwt. 45% Super. . . . . | 0                           | 19 | 70 | 1     | 3  | 0   | 2     | 0  | 56 | 1     | 17 | 84 | 1     | 7  | 98 | 1     | 9  | 84  |

The above results for the five seasons show that Plot No. 2, dressed with Lime and Superphosphate, has returned the greatest yield of hay, viz., 2½cwt. per acre greater than that dressed with Superphosphate only.

This increase is insufficient to warrant the application of 5cwt. Lime, costing approximately 12s. 6d. per acre. However, the stubble feed and early winter growths on Plot No. 2 have been very much greater than from other plots, giving extra useful grazing, which is solely attributable to the Lime. As these plots are not fenced individually, no record of this value is available.

## EXPERIMENTS WITH VARIOUS PHOSPHATIC FERTILISERS ON CEREALS IN CONJUNCTION WITH SUBTERRANEAN CLOVER.

Quantities of Ephos Phosphate and Bone Manure have been given to the Department by distributing firms, and these were again tested in Fields Nos. 7A, 7B, and 7C. The plots are set out according to the phosphatic content of the fertilisers—each one being tested in equivalence in phosphoric anhydride—with applications of both 90lbs. and 180lbs. respectively of 45 per cent. Superphosphate. Field No. 7B carried the cereal, an oat crop this year, whilst Nos. 7A and 7C were top dressed with similar quantities of fertilisers, with the exception of lime, the one application of 1 ton of lime per acre given to Plot No. 7, being intended as sufficient for at least six seasons. The





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fields are being worked under a three-course system of rotation, consisting of one cereal crop, followed by two years of Subterranean Clover. The second cycle of crops is now being grown, so that Field No. 7a this year carried its first cereal crop following clover. Algerian oats were used, and produced good stands on the plots, whose yields, however, were unfortunately somewhat reduced by the effects of rough weather during harvesting. On account of shortage of available labor, we were again unable to harvest the clover for hay, and as individual plots are not fenced no grazing figures are available. The following table shows the yields of wheat received during 1927 and 1928, and of oats received for 1929:—

TABLE 22.—*Experiments with Phosphatic Fertilisers on Wheat and Oats.*

| Plot. | Fertiliser per Acre.                  | Yield per Acre. |    |        |    |       |    |
|-------|---------------------------------------|-----------------|----|--------|----|-------|----|
|       |                                       | Wheat.          |    | Wheat. |    | Oats. |    |
|       |                                       | 1927.           |    | 1928.  |    | 1929. |    |
|       |                                       | B.              | L. | B.     | L. | B.    | L. |
| 1     | 90lbs. 45% Phosphate .....            | 17              | 19 | 19     | 36 | 19    | 15 |
| 2     | 66lbs. 61% Ephos Phosphate .....      | 13              | 50 | 17     | 7  | 18    | 13 |
| 3     | No manure .....                       | 10              | 52 | 3      | 18 | 12    | 3  |
| 4     | 180lbs. 45% Phosphate .....           | 22              | 3  | 24     | 36 | 22    | 36 |
| 5     | 132lbs. 61% Ephos Phosphate .....     | 15              | 52 | 23     | 14 | 17    | 10 |
| 6     | 120lbs. 33% Bone Manure .....         | 19              | 34 | 12     | 49 | 11    | 30 |
| 7     | 1 ton Lime and 90lbs. 45% Super. .... | 23              | 35 | 25     | 25 | 15    | 5  |
| 8     | 240lbs. 33% Bone Manure .....         | 17              | 55 | 20     | 46 | 14    | 39 |

## EXPERIMENTS WITH SPECIAL FERTILISERS ON WHEAT.

A test of special fertilisers was carried out on 1-acre plots in Field No. 20E, using Leak's Rust Proof wheat. The land had been under clover pasture for three seasons. The following table shows the fertilisers applied, their analyses, and yields for the past three seasons:—

TABLE 23.—*Experiments with Special Fertilisers on Wheat, 1927-29.*

| Plot. | Fertiliser per Acre.                       | Analyses of Fertilisers. |               |               |            |      |         |
|-------|--------------------------------------------|--------------------------|---------------|---------------|------------|------|---------|
|       |                                            | W.S.                     | Citrate       | Acid          | Total      | Nit. | Potash. |
|       |                                            | Phos.<br>%               | S. Phos.<br>% | S. Phos.<br>% | Phos.<br>% | %    | %       |
| 1     | 112lbs. Eden Plant Food .....              | 40                       | —             | —             | 40         | 1    | 2       |
| 2     | 112lbs. Special Manure No. 5 ..            | 42                       | 1.5           | 2.5           | 46         | 1.5  | —       |
| 3     | 112lbs. Special Manure No. 6 ..            | 42                       | —             | —             | 42         | 1    | 2       |
| 4     | 112lbs. G.V.O. ....                        | 26                       | 4             | 18            | 42         | 1.5  | 2.5     |
| 5     | 112lbs. 45% Superphosphate ..              | 45                       | —             | —             | 45         | —    | —       |
| 6     | 56lbs. Eden Plant Food .....               | 40                       | —             | —             | 40         | 1    | 2       |
| 7     | 138lbs. Special Manure No. 6 ..            | 42                       | —             | —             | 42         | 1    | 2       |
| 8     | 177lbs. 45% Superphosphate ..              | 45                       | —             | —             | 45         | —    | —       |
| 9     | 112lbs. Complete Orchard Man-<br>ure ..... | 18                       | 6             | 4             | 28         | 5    | 4.5     |
| 10    | 50lbs. 100% Super. (Cresco)....            | 100                      | —             | —             | 100        | —    | —       |
| 11    | 48lbs. Triple Superphosphate ..            | 104.8                    | —             | —             | 104.8      | —    | —       |

| Plot. | Yield per Acre. |    |       |    |       |    |
|-------|-----------------|----|-------|----|-------|----|
|       | 1927.           |    | 1928. |    | 1929. |    |
|       | B.              | L. | B.    | L. | B.    | L. |
| 1     | 17              | 29 | 9     | 35 | 16    | 33 |
| 2     | —               | —  | 11    | 59 | —     | —  |
| 3     | 19              | 31 | 6     | 16 | 18    | 54 |
| 4     | —               | —  | 10    | 43 | 17    | 33 |
| 5     | 19              | 24 | 9     | 42 | 17    | 38 |
| 6     | 19              | 38 | 7     | 57 | 21    | 43 |
| 7     | 20              | 19 | 10    | 21 | 20    | 24 |
| 8     | 20              | 49 | 11    | 36 | 18    | 40 |
| 9     | —               | —  | —     | —  | 19    | 28 |
| 10    | —               | —  | —     | —  | 16    | 14 |
| 11    | —               | —  | —     | —  | 21    | 16 |

Mean, 1927-29.



## ROTATION OF CROPS EXPERIMENTS.

*Rotation A.*—This five-course rotation of 30-acre fields, consisting of wheat, oats, and three years Subterranean Clover was commenced in 1923. The following table shows the results received for the past seven seasons:—

TABLE 24.—Five-Course Rotation of Crops, Kybybolite, 1923-29.

| Year.    | Wheat. |       | Oats. |       | Subt. Clover,<br>First Year. | Subt. Clover,<br>Second Year. | Subt. Clover,<br>Third Year. |
|----------|--------|-------|-------|-------|------------------------------|-------------------------------|------------------------------|
|          | B.     | L.    | B.    | L.    | Sheep per Acre.              | Sheep per Acre.               | Sheep per Acre.              |
| 1923.... | (20D)  | —     | (20C) | 4 27  | —                            | —                             | —                            |
| 1924.... | (20E)  | 16 19 | (20D) | 19 29 | (20C) 2-74                   | —                             | —                            |
| 1925.... | (20A)  | 14 53 | (20E) | 12 32 | (20D) 1-84                   | (20C) 3-58                    | —                            |
| 1926.... | (20B)  | 8 44  | (20A) | 19 20 | (20E) 2-35                   | (20D) 2-28                    | (20C) 2-12                   |
| 1927.... | (20C)  | 19 57 | (20B) | 31 6  | (20A) 3-13                   | (20E) 1-84                    | (20D) 2-47                   |
| 1928.... | (20D)  | 10 44 | (20C) | 20 19 | (20B) 3-25                   | (20A) 2-34                    | (20E) 2-85                   |
| 1929.... | (20E)  | 15 53 | (20D) | 7 19  | (20C) 1-73                   | (20B) 2-76                    | (20A) 3-83                   |
| Means.   | 14     | 27    | 16    | 22    | 2-51                         | 2-56                          | 2-82                         |

Subterranean Clover is easily the most valuable crop in the above series, and the table shows the consistency of growth obtained from the plant. From all the clover fields in the past six years this series has exceeded in carrying capacity an average of 2½ sheep per acre annually. This means that on the 150-acre block of five fields we are able to carry 225 sheep annually, as well as cultivate 60 acres, and have the stubble feed from the crops to spare.

*Rotation B.*—A six-course rotation has been carried on in a series of 2-acre fields since 1918. The order of cropping is as follows:—Wheat, Oats and Vetches, Turnips, Barley, Rye Grass and Clover for two years. The second cycle of crops has now been completed. The yield of crops in this rotation are as follows:—

TABLE 25.—Six-course Rotation of Crops, Kybybolite, 1918-1929.

| Year.     | Wheat.   |    | Oats and Vetches. |    |     | Turnips.<br>Sheep<br>per Acre. | Oats or Barley. |                   | Rye Grass and Clover.<br>Grazing.<br>Sheep per Acre. |              |
|-----------|----------|----|-------------------|----|-----|--------------------------------|-----------------|-------------------|------------------------------------------------------|--------------|
|           | B.       | L. | T.                | C. | L.  |                                | B.              | L.                | First Year.                                          | Second Year. |
| 1918 (9A) | 8        | 11 | (9B) 0            | 14 | 12  | —                              | (9D) 9          | 4 (oats)          | —                                                    | —            |
| 1919 (9F) | 11       | 19 | (9A) 0            | 10 | 56  | —                              | (9C) 13         | 17 (oats)         | —                                                    | —            |
| 1920 (9E) | 15       | 24 | (9F) 1            | 15 | 92  | —                              | (9B) 11         | 21 (oats)         | —                                                    | —            |
| 1921 (9D) | 12       | 6  | (9E) 1            | 13 | 35  | —                              | (9A) 8          | 22 (oats)         | —                                                    | —            |
| 1922 (9C) | 20       | 59 | (9D) 1            | 7  | 93  | (9F) 5-85                      | (9F) 21         | 1 (barley)        | —                                                    | —            |
| 1923 (9B) | 9        | 21 | (9C) 0            | 14 | 106 | (9E) 3-20                      | (9E) 24         | 19 (barley)       | (9F) 2-14                                            | —            |
| 1924 (9A) | Hay      | —  | (9B) 1            | 11 | 64  | (9D) 5-17                      | (9D) 35         | 13 (barley)       | (9E) 1-18                                            | (9F) 2-00    |
| 1925 (9F) | not sown | —  | (9A) 1            | 15 | 64  | (9C) 2-36                      | (9C) 22         | 10 (barley)       | (9D) 0-71                                            | (9E) 1-33    |
| 1926 (9E) | 7 32     | —  | (9F) 1            | 18 | 29  | (9B) 3-52                      | (9B) 31         | 24 (barley)       | (9C) 1-47                                            | (9D) 2-30    |
| 1927 (9D) | 22 14    | —  | (9E) 1            | 8  | 75  | (9A) failure                   | (9A) 23         | 22 (barley)       | (9B) 0-63                                            | (9C) 1-50    |
| 1928 (9C) | not sown | —  | (9D) 2            | 4  | 95  | (9F) 2-66                      | (9F) 33         | 11 (barley)       | (9A) 1-98                                            | (9B) 1-71    |
| 1929 (9B) | ensilage | —  | (9C) 2            | 4  | 21  | (9E) 2-56                      | (9E) 8          | 24 (barley)       | (9F) 1-27                                            | (9A) 1-22    |
| Means     | 13       | 23 | 1                 | 9  | 108 | 3-16                           | 10              | 6 (oats, 4 years) | 1-34                                                 | 1-68         |
|           |          |    |                   |    |     |                                | 24              | 47 (barley)       |                                                      |              |

## M. F. HODGE, A.C.I.V.

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In Table 25 Alsike Clover with both Italian and Perennial Rye Grasses have been tried. The Perennial Rye Grass has given better growth and feed than the Italian, and consequently the latter has not been sown in the mixture during the last two seasons. The most successful crops in the rotation have been turnips and spring-sown barley. The former has carried the equivalent of 3.16 sheep per acre over the past eight seasons, which is approximately  $\frac{1}{2}$  sheep per acre better than the average for turnip grazing, whilst barley has yielded 25bush. per acre, which is 3bush. better than the farm average for the same period.

*Rotation C.*—The Norfolk four-course rotation—turnips, barley or oats, peas, and wheat—is being tested in 4-acre fields. The test was commenced in 1919, and the third cycle of crops is now being grown. The following table shows the returns received for the past 11 seasons:—

TABLE 26.—*Four-Course Rotation of Crops, Kybybolite, 1919-29.*

| Year.      | Peas.        | Wheat.<br>Grain. | Hay.     | Turnips.<br>Sheep<br>per Acre. | Oats or Barley.                |
|------------|--------------|------------------|----------|--------------------------------|--------------------------------|
|            | B. L.        | B. L.            | T. C. L. |                                | B. L.                          |
| 1919 ..... | (4D) 2 31    | (4A) 29 26       | —        | —                              | (4C) 17 4 (oats)               |
| 1920 ..... | (4C) 1 32    | (4D) 29 50       | —        | —                              | (4B) 32 37 (oats)              |
| 1921 ..... | (4B) 3 14    | (4C) 8 40        | 1 13 92  | (4D) 1-74                      | (4A) destroyed (oats)          |
| 1922 ..... | (4A) fed off | (4B) —           | 1 17 10  | (4C) 2-63                      | (4D) 30 0 (oats)               |
| 1923 ..... | (4D) 21 57   | (4A) —           | 1 5 95   | (4B) 6-10                      | (4C) hay 2 tons 8cwts. 30lbs.  |
| 1924 ..... | (4C) 18 53   | (4D) —           | 2 3 101  | (4A) 1-54                      | (4B) 44 32 (barley)            |
| 1925 ..... | (4B) 7 39    | (4C) —           | 3 0 60   | (4D) 1-20                      | (4A) 18 17 (barley)            |
| 1926 ..... | (4A) 12 21   | (4B) —           | 2 9 73   | (4C) 2-75                      | (4D) 37 34 (barley)            |
| 1927 ..... | (4D) fed off | (4A) 26 49       | 1 11 8   | (4B) 2-47                      | (4C) 36 45 (barley)            |
| 1928 ..... | (4C) 18 5    | (4D) 6 26        | —        | (4A) 2-51                      | (4B) 34 24 (barley)            |
| 1929 ..... | (4B) 8 59    | (4C) —           | 2 3 35   | (4D) —                         | (4A) 7 23 (barley)             |
| Means .    | 10 35        | 20 14            | 2 0 73   | 2-62                           | 19 38 (oats)<br>29 46 (barley) |

Of the above crops, the average yields of all, except peas, have yielded above the mean yields of the Farm. Yields of barley and hay have been particularly good, being 5bush. and 8cwts. per acre respectively better than Farm averages for the same periods.

*Rotation D.*—A six-course rotation—peas, wheat, turnips, oats or barley, clover, grazing oats—is under test in 9-acre fields. The series was commenced in 1920, and the returns to date are as follows:—

TABLE 27.—*Six-Course Rotation of Crops, Kybybolite, 1920-29.*

| Year.      | Peas.        | Wheat.                                  | Turnips.<br>Sheep<br>per Acre. | Oaten Hay.   | Clover.<br>Sheep<br>per Acre. | Barley.    |
|------------|--------------|-----------------------------------------|--------------------------------|--------------|-------------------------------|------------|
|            | B. L.        | B. L.                                   |                                | T. C. L.     |                               | B. L.      |
| 1920 ..... | (6F) failure | (6A) 17 59                              | —                              | (6C) 1 5 5   | —                             | (6B) 6 18  |
| 1921 ..... | (6E) 13 5    | (6F) 18 44                              | (6A) 1-75                      | (6B) 1 2 32  | (6C) 1-08                     | (6D) 5 7   |
| 1922 ..... | (6D) 19 26   | (6E) 2 11 49                            | (6F) 1-58                      | (6A) 1 18 39 | (6B) 1-39                     | (6C) 17 22 |
| 1923 ..... | (6C) 6 10    | (6D) 1 11 20                            | (6E) 2-31                      | (6B) 0 10 65 | (6A) 1-01                     | (6F) 11 33 |
| 1924 ..... | (6B) 31 57   | (6C) 2 0 97                             | (6D) 1-18                      | (6A) 1 17 76 | (6F) 1-05                     | (6E) 20 14 |
| 1925 ..... | (6A) 10 6    | (6B) 1 8 0                              | (6C) 1-54                      | (6F) 1 18 48 | (6E) 0-91                     | (6D) 23 42 |
| 1926 ..... | (6F) 11 0    | (6A) 29 28                              | (6B) 3-07                      | (6E) 1 11 46 | (6D) 3-20                     | (6C) 30 0  |
| 1927 ..... | (6E) fed off | (6F) 18 41                              | (6A) 3-28                      | (6D) 2 2 28  | (6C) 1-65                     | (6B) 23 1  |
| 1928 ..... | (6D) 11 18   | (6E) 2 3 37                             | (6F) 2-56                      | (6C) 2 6 62  | (6B) 1-64                     | (6A) 37 6  |
| 1929 ..... | (6C) 2 33    | (6D) 1 4 78                             | —                              | —            | (6A) 2-69                     | (6F) 8 10  |
| Means .    | 13 12        | 1 15 86 (hay)<br>21bush. 18lbs. (wheat) | 2-16                           | 1 12 57      | 1-61                          | 18 15      |

In the above rotation, trials have been made with various annual clovers, with but little success, and consequently since 1928, Subterranean Clover has been sown, and it is proposed in future to discontinue sowing peas, and reduce the cereal crops in the series. The order of cropping in future will be turnips, barley, cereal hay, Subterranean Clover, grazing (2 years), clover hay.



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.

Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending September 30th, 1930. |                         |                         |         |
|--------------------------|---------------------|----------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                      | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                        | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 45                                       | (5) 81                  | (6) *                   | 126     |
| Williams, W. R. ....     | Frewville .....     | (7) 89                                       | (8) 111                 | (9) 146                 | 346     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 112                                     | (11) 110                | (12) *                  | 222     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 105                                     | (14) 127                | (15) *                  | 232     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 70                                      | (17) *                  | (18) *                  | 70      |
| Pearman, E. D. ....      | Rosewater .....     | (19) 100                                     | (20) 95                 | (21) 94                 | 289     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                       | (23) *                  | (24) 94                 | 94      |
| Burton, C. J. C. ....    | Mallala .....       | (25) 115                                     | (26) 103                | (27) 113                | 331     |
| Heath, H. E. ....        | Mile End .....      | (28) 110                                     | (29) *                  | (30) 94                 | 204     |
| Heath, H. E. ....        | Mile End .....      | (31) 97                                      | (32) 74                 | (33) 100                | 271     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 82                                      | (35) 103                | (36) 109                | 294     |
| Howard, T. W. ....       | Woodville .....     | (37) 112                                     | (38) 72                 | (39) 97                 | 281     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                       | (41) 109                | (42) 91                 | 200     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 64                                      | (44) 117                | (45) 101                | 282     |
| Gameau, V. F. ....       | Woodville .....     | (46) 105                                     | (47) 97                 | (48) 63                 | 265     |
| Gameau, V. F. ....       | Woodville .....     | (49) 106                                     | (50) 60                 | (51) 97                 | 263     |
| Aird, J. R. & Son ....   | Kilkenny .....      | (52) 83                                      | (53) 102                | (54) 115                | 300     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                       | (56) 96                 | (57) *                  | 96      |
| Barrett, L. ....         | Angaston .....      | (58) 75                                      | (59) 83                 | (60) 95                 | 253     |
| Barrett, L. ....         | Angaston .....      | (61) *                                       | (62) 42                 | (63) 113                | 155     |
| Barrett, L. ....         | Angaston .....      | (64) 85                                      | (65) 58                 | (66) 70                 | 213     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 75                                      | (68) 64                 | (69) 112                | 251     |
| Wiese, W. ....           | Cabra .....         | (70) 124                                     | (71) 110                | (72) 101                | 335     |
| Wiese, W. ....           | Cabra .....         | (73) 111                                     | (74) 108                | (75) 91                 | 310     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 106                                     | (77) 101                | (78) 98                 | 305     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                       | (80) †                  | (81) 99                 | 99      |
| Riggs, N. ....           | Camden Park .....   | (82) 129                                     | (83) 104                | (84) *                  | 233     |
| Riggs, N. ....           | Camden Park .....   | (85) 124                                     | (86) 90                 | (87) 102                | 316     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 103                                     | (89) 118                | (90) 124                | 345     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 77                                      | (92) 108                | (93) 118                | 303     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                       | (95) 86                 | (96) *                  | 86      |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 120                                     | (98) 98                 | (99) *                  | 218     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 116                                    | (101) 39                | (102) *                 | 155     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 90                                     | (104) *                 | (105) *                 | 90      |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 67                                     | (107) 77                | (108) 97                | 241     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 101                                    | (110) 131               | (111) *                 | 232     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 117                                    | (113) 95                | (114) *                 | 212     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 92                                     | (116) 94                | (117) 96                | 282     |
| Hill, W. ....            | Knoxville .....     | (118) 108                                    | (119) 104               | (120) 103               | 315     |
| Hill, W. ....            | Knoxville .....     | (121) 110                                    | (122) 102               | (123) 100               | 312     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 81                                     | (125) *                 | (126) 73                | 154     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                      | (128) 109               | (129) 100               | 209     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 35                                     | (131) 100               | (132) 109               | 244     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 88                                     | (134) 120               | (135) 121               | 329     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 125                                    | (137) 110               | (138) 97                | 332     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 117                                    | (140) 86                | (141) 62                | 265     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.             | Address.            | Score for Month ended September 30th, 1930. |                         |                         |               |
|--------------------------|---------------------|---------------------------------------------|-------------------------|-------------------------|---------------|
|                          |                     | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals.       |
| Compton, R. C. ....      | Woodeforde .....    | (142) 54                                    | (143) 109               | (144) 100               | 263           |
| Connor, D. C. ....       | Gawler .....        | (145) 59                                    | (146) 89                | (147) 63                | 211           |
| Robinson, A. E. ....     | Hectorville .....   | (148) 128                                   | (149) 113               | (150) 110               | 351           |
| Vann, R. S. ....         | New Hindmarsh ...   | (151) 90                                    | (152) 70                | (153) 79                | 239           |
| McLean, J. G. ....       | Black Forest .....  | (154) 60                                    | (155) 43                | (156) 81                | 184           |
| Fidge, H. ....           | Clarence Park ..... | (157) 72                                    | (158) 71                | (159) *                 | 143           |
| Fidge, H. ....           | Clarence Park ..... | (160) 55                                    | (161) 71                | (162) 111               | 237           |
| Tolhurst, A. E. ....     | Torrens Park .....  | (163) 123                                   | (164) 57                | (165) *                 | 180           |
| Tolhurst, A. E. ....     | Torrens Park .....  | (166) 119                                   | (167) 60                | (168) 117               | 296           |
| Monkhouse, A. J. ....    | Woodside .....      | (169) 102                                   | (170) 104               | (171) *                 | 206           |
| Monkhouse, A. J. ....    | Woodside .....      | (172) *                                     | (173) *                 | (174) 93                | 93            |
| Monkhouse, A. J. ....    | Woodside .....      | (175) 88                                    | (176) *                 | (177) *                 | 88            |
| Monkhouse, A. J. ....    | Woodside .....      | (178) *                                     | (179) *                 | (180) 62                | 62            |
| Sage, H. R. ....         | Nuriootpa .....     | (181) 64                                    | (182) *                 | (183) 111               | 175           |
| Mitchell, W. J. ....     | Woodside .....      | (184) 108                                   | (185) *                 | (186) 128               | 236           |
| George, L. E. ....       | Redfern .....       | (187) 119                                   | (188) 123               | (189) 83                | 325           |
| George, L. E. ....       | Redfern .....       | (190) 116                                   | (191) 104               | (192) *                 | 220           |
| George, L. E. ....       | Redfern .....       | (193) 91                                    | (194) 116               | (195) 115               | 322           |
| George, L. E. ....       | Redfern .....       | (196) 97                                    | (197) 119               | (198) 127               | 343           |
| Aird, J. R., & Son ..... | Kilkenny .....      | (199) 111                                   | (200) 106               | (201) *                 | 217           |
| Aird, J. R., & Son ..... | Kilkenny .....      | (202) 90                                    | (203) 69                | (204) 75                | 234           |
| Gameau, V. F. ....       | Woodville .....     | (205) 95                                    | (206) 75                | (207) 83                | 253           |
| <b>Totals</b> .....      | .....               | <b>5,612</b>                                | <b>5,293</b>            | <b>4,983</b>            | <b>15,838</b> |

*Section 3.—Black Orpingtons.*

| Competitors.             | Address.            | Score for Month ending September 30th, 1930. |                         |                         |              |
|--------------------------|---------------------|----------------------------------------------|-------------------------|-------------------------|--------------|
|                          |                     | Bird No. and Eggs Laid.                      | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals.      |
| Aird, J. R., & Son ..... | Kilkenny .....      | (208) 98                                     | (209) 93                | (210) 98                | 289          |
| Aird, J. R., & Son ..... | Kilkenny .....      | (211) 70                                     | (212) 105               | (213) *                 | 175          |
| Williams, W. R. ....     | Frewville .....     | (214) 92                                     | (215) 108               | (216) 100               | 300          |
| Williams, W. R. ....     | Frewville .....     | (217) †                                      | (218) *                 | (219) 77                | 77           |
| Gurr, A. and H. ....     | Scott's Creek ..... | (220) *                                      | (221) *                 | (222) *                 | —            |
| Andrewartha, A. ....     | Underdale .....     | (223) *                                      | (224) 115               | (225) 123               | 238          |
| McFarlane, A. S. ....    | Kilkenny .....      | (226) 120                                    | (227) 117               | (228) 98                | 335          |
| Connor, D. C. ....       | Gawler .....        | (229) *                                      | (230) 98                | (231) *                 | 98           |
| Gillick, W. J. ....      | New Hindmarsh ...   | (232) 77                                     | (233) *                 | (234) *                 | 77           |
| Osborn, E. L. ....       | Camden .....        | (235) 86                                     | (236) 101               | (237) 105               | 292          |
| <b>Totals</b> .....      | .....               | <b>543</b>                                   | <b>737</b>              | <b>601</b>              | <b>1,881</b> |

*Section 4.—Rhode Island Reds.*

| Competitors.        | Address.            | Score for Month ending September 30th, 1930. |                         |                         |            |
|---------------------|---------------------|----------------------------------------------|-------------------------|-------------------------|------------|
|                     |                     | Bird No. and Eggs Laid.                      | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals.    |
| Gameau, V. F. ....  | Woodville .....     | (238) 79                                     | (239) 94                | (240) 50                | 223        |
| Fidge, H. ....      | Clarence Park ..... | (241) 104                                    | (242) 93                | (243) 68                | 265        |
| <b>Totals</b> ..... | .....               | <b>183</b>                                   | <b>187</b>              | <b>118</b>              | <b>488</b> |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



## "HERD TESTING" GOLD MEDAL COMPETITION.

[By Mr. P. D. JEFFERY, Chief Clerk, Department of Agriculture.]

Three years ago the United Stud Dairy Cattle Breeders' Association of South Australia was instrumental in arranging an annual Butterfat Output Competition among those of its members whose herds were under official test, and during each of the three years, Government has offered a Gold Medal for the owner of the winning herd.

In the first year's competition, the herd of Mr. C. J. Morris, of Monteith, secured top place, with an average butterfat production of 556.58lbs.; and for the second year the winning herd was that of Mr. J. A. J. Pfitzner, of Hampden, the average output being 456.81lbs.

Results of the third year's competition are now available, and from the summary which is attached hereto it will be seen that Mr. C. J. Morris is once again the successful competitor. On this occasion his herd has averaged 496.69lbs. butterfat.

For the information of competitors and those who are not yet associated with Departmental Herd Testing schemes, it might be advisable to give a rough idea of the conditions under which the Competition is carried out, otherwise some of the figures in the attached summary will not convey their full meaning.

The conditions are somewhat as follows:—

1. No herd of less than 6 cows is eligible to compete.
2. In a herd of more than 6 cows, the owner has the right to withhold from competition 25 per cent. of the herd.
3. One in every six or part thereof cows in a herd must be a matured animal.
4. The butterfat standards as set by Government for the various ages of cows are not used in this competition, but instead handicaps arranged by the competitors themselves are brought into operation. These handicaps are:—

|                                                | Butterfat.<br>Lbs. |
|------------------------------------------------|--------------------|
| For heifers under 2 years at calving . . . . . | 80                 |
| Two and under 3 years . . . . .                | 60                 |
| Three and under 4 years . . . . .              | 40                 |
| Four and under 5 years . . . . .               | 20                 |
| Five years and over . . . . .                  | Nil                |

### PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1931.

### Eggs for Hatching and Day-old Chickens.

WHITE LEGHORNS ONLY. DELIVERY—JULY, AUGUST, and SEPTEMBER.

#### PRICES—

EGGS—10s. per Setting of 15 Eggs; Incubator Lots, £2 10s. per 100.

DAY-OLD CHICKENS—17s. 6d. per dozen, £6 per 100. Free on rail, Salisbury.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury.

C. F. ANDERSON, Manager.



SUMMARY.

GOLD MEDAL COMPETITION, 1929-30.

| Breeder.                          | Total Cows.    |                | No. of Mature Cows. | Butterfat Produced. | Handicaps. | Total Butterfat. | Average per Cow. | Placings. |
|-----------------------------------|----------------|----------------|---------------------|---------------------|------------|------------------|------------------|-----------|
|                                   | No. Competing. | No. Discarded. |                     |                     |            |                  |                  |           |
| Ansell, C. W. ....                | 9              | 2              | 3                   | 2,584.34            | 320        | 2,904.34         | 322.70           | 15        |
| Dawkins, J. H. ....               | 11             | 3              | 5                   | 3,772.56            | 340        | 4,112.56         | 373.87           | 9         |
| Fischer, J. H., & Son ..          | 6              | —              | 3                   | 2,331.17            | 140        | 2,471.17         | 411.86           | 6         |
| Hawker, W. ....                   | 6              | —              | 2                   | 2,572.61            | 200        | 2,772.61         | 462.10           | 2         |
| Inspector-General of Hospitals .. | 10             | 3              | 5                   | 2,639.69            | 260        | 2,899.69         | 289.97           | 20        |
| Kleeman, H. T. ....               | 6              | —              | 3                   | 2,060.53            | 60         | 2,120.53         | 353.42           | 12        |
| Kuchel, H. B. ....                | 8              | 2              | 2                   | 2,217.09            | 300        | 2,517.09         | 314.64           | 17        |
| Kybybolite Experimental Farm ..   | 25             | 8              | 8                   | 7,036.96            | 680        | 7,716.96         | 308.68           | 18        |
| Morris, C. J. ....                | 10             | 3              | 6                   | 4,806.90            | 160        | 4,966.90         | 496.69           | 1         |
| Mountstephen, H. ....             | 10             | 3              | 2                   | 3,529.31            | 400        | 3,929.31         | 392.93           | 7         |
| Neumann, Mrs. B. ....             | 6              | —              | 2                   | 1,552.67            | 200        | 1,752.67         | 292.11           | 19        |
| Nicholls, E. & A. ....            | 7              | 2              | 3                   | 2,757.51            | 160        | 2,917.51         | 416.79           | 5         |
| Oates, J. T. ....                 | 11             | 3              | 4                   | 3,291.18            | 380        | 3,671.18         | 333.74           | 14        |
| Pfitzner, J. A. J. ....           | 12             | 3              | 6                   | 4,921.21            | 260        | 5,181.21         | 431.76           | 4         |
| Roseworthy College ..             | 15             | 4              | 3                   | 5,262.01            | 480        | 5,742.01         | 382.80           | 8         |
| Secomb, H. D., & Son ..           | 7              | 2              | 3                   | 2,030.56            | 200        | 2,230.56         | 318.65           | 16        |
| Shillabeer, H. H. ....            | 22             | 7              | 9                   | 6,881.74            | 500        | 7,381.74         | 335.53           | 13        |
| Sieber, A. B. ....                | 6              | 1              | 3                   | 2,581.69            | 180        | 2,761.69         | 460.28           | 3         |
| Traeger, E. O. ....               | 6              | 1              | 1                   | 1,941.12            | 240        | 2,181.12         | 363.52           | 10        |
| Walsh, H. R. ....                 | 7              | 2              | 2                   | 2,199.85            | 280        | 2,479.85         | 354.26           | 11        |



**RESULTS OF COMPETITION FOR GOLD MEDAL FOR HIGHEST HERD  
BUTTERFAT AVERAGE, 1929-30.**

| Name of Cow.                             | Butterfat. | Age Between. | Handicap. | Total. | Remarks.                                                                            |
|------------------------------------------|------------|--------------|-----------|--------|-------------------------------------------------------------------------------------|
|                                          | Lbs.       | Years.       |           | Lbs.   |                                                                                     |
| <i>C. W. Ansell, Bletchley—</i>          |            |              |           |        |                                                                                     |
| Jean III. of Dalebank .....              | 403-32     | Mature       | —         | 403-32 | Total butterfat,<br>2,904-34lbs.<br><br>9 cows averaged<br>322-70lbs.<br>butterfat  |
| Pembroke Duchess .....                   | 337-93     | 3 & 4        | 40        | 377-93 |                                                                                     |
| Pembroke Lotus .....                     | 280-95     | 2 & 3        | 60        | 340-95 |                                                                                     |
| Lotus II. of Dalebank .....              | 293-00     | Mature       | —         | 293-00 |                                                                                     |
| Pembroke Moss .....                      | 176-07     | 1 & 2        | 80        | 256-07 |                                                                                     |
| Pembroke Neta .....                      | 192-71     | 2 & 3        | 60        | 252-71 |                                                                                     |
| Pembroke Sylvia .....                    | 292-28     | 2 & 3        | 60        | 352-28 |                                                                                     |
| Pembroke Viola .....                     | 303-91     | 4 & 5        | 20        | 323-91 |                                                                                     |
| Viola II. of Dalebank .....              | 304-17     | Mature       | —         | 304-17 |                                                                                     |
| Duchess 4th of Dalebank .....            | 65-58      | 4 & 5        | 20        | 85-58  | Worst 25 per cent.<br>of herd                                                       |
| Pembroke Mona .....                      | 146-93     | 1 & 2        | 80        | 226-93 |                                                                                     |
| <i>J. H. Dawkins, Gawler—</i>            |            |              |           |        |                                                                                     |
| Para Wirra Cherry .....                  | 310-82     | 2 & 3        | 60        | 370-82 | Total butterfat,<br>4,112-56lbs.<br><br>11 cows averaged<br>373-87lbs.<br>butterfat |
| Cherry 10th of Willow Farm .....         | 405-26     | Mature       | —         | 405-26 |                                                                                     |
| Para Wirra Dulcie .....                  | 382-91     | 3 & 4        | 40        | 422-91 |                                                                                     |
| Iris of Grantala .....                   | 274-59     | Mature       | —         | 274-59 |                                                                                     |
| Iris of Para Wirra .....                 | 377-19     | 4 & 5        | 20        | 397-19 |                                                                                     |
| Para Wirra Lady Iris .....               | 320-42     | 2 & 3        | 60        | 380-42 |                                                                                     |
| Maglona III. of Willow Farm .....        | 372-62     | Mature       | —         | 372-62 |                                                                                     |
| Millie 16th of Willow Farm .....         | 411-20     | Mature       | —         | 411-20 |                                                                                     |
| Millie 21st of Willow Farm .....         | 361-19     | Mature       | —         | 361-19 |                                                                                     |
| Para Wirra Snowflake .....               | 346-13     | 1 & 2        | 80        | 426-13 |                                                                                     |
| Para Wirra Sunrise .....                 | 210-23     | 1 & 2        | 80        | 290-23 |                                                                                     |
| Para Wirra Eileen II. ....               | 116-23     | 1 & 2        | 80        | 196-23 | Worst 25 per cent.<br>of herd                                                       |
| Para Wirra Maglona .....                 | 73-57      | 1 & 2        | 80        | 153-57 |                                                                                     |
| Para Wirra Sunshine .....                | 96-03      | 3 & 4        | 40        | 136-03 |                                                                                     |
| <i>J. H. Fischer &amp; Son, Wasleys—</i> |            |              |           |        |                                                                                     |
| Angle Farm Fashion .....                 | 399-53     | Mature       | —         | 399-53 | Total butterfat,<br>2,471-17lbs.<br><br>6 cows averaged<br>411-86lbs.<br>butterfat  |
| Angle Farm Heatherbelle .....            | 381-90     | 2 & 3        | 60        | 441-90 |                                                                                     |
| Angle Farm May .....                     | 470-33     | 4 & 5        | 20        | 490-33 |                                                                                     |
| Angle Farm Primrose .....                | 395-10     | 2 & 3        | 60        | 455-10 |                                                                                     |
| Angle Farm Ruby .....                    | 323-85     | Mature       | —         | 323-85 |                                                                                     |
| Gowrie Park Barbara .....                | 360-46     | Mature       | —         | 360-46 |                                                                                     |
| <i>W. Hawker, Clare—</i>                 |            |              |           |        |                                                                                     |
| Anama Gem's Diamond .....                | 369-91     | 2 & 3        | 60        | 429-91 | Total butterfat,<br>2,772-61lbs.<br><br>6 cows averaged<br>462-10lbs.<br>butterfat  |
| Anama Maggie's Winsome .....             | 572-32     | Mature       | —         | 572-32 |                                                                                     |
| Anama Netherland Countess .....          | 323-36     | 2 & 3        | 60        | 383-36 |                                                                                     |
| Anama Pietertje's Diamond .....          | 459-78     | 3 & 4        | 40        | 499-78 |                                                                                     |
| Anama Pontiac Princess .....             | 316-79     | 3 & 4        | 40        | 356-79 |                                                                                     |
| Anama Segis Maggie .....                 | 530-45     | Mature       | —         | 530-45 |                                                                                     |
| <i>Inspector-General of Hospitals—</i>   |            |              |           |        |                                                                                     |
| Blossom of Northfield .....              | 275-57     | Mature       | —         | 275-57 | Total butterfat,<br>2,899-69lbs.<br><br>10 cows averaged<br>289-97lbs.<br>butterfat |
| Buttercup 1st of Ben Lomond .....        | 207-64     | 2 & 3        | 60        | 267-64 |                                                                                     |
| Flirt of Ben Lomond .....                | 324-64     | Mature       | —         | 324-64 |                                                                                     |
| Gayboy's Dora of Wangara .....           | 302-47     | Mature       | —         | 302-47 |                                                                                     |
| Gayboy's Sunflower of Wangara .....      | 344-61     | Mature       | —         | 344-61 |                                                                                     |
| Princess II. of Ben Lomond .....         | 216-05     | 2 & 3        | 60        | 276-05 |                                                                                     |
| Princess III. of Ben Lomond .....        | 326-81     | 2 & 3        | 60        | 386-81 |                                                                                     |
| Tot 1st of Ben Lomond .....              | 155-45     | 3 & 4        | 40        | 195-45 |                                                                                     |
| Triumph's Tot of Wangara .....           | 229-70     | Mature       | —         | 229-70 |                                                                                     |
| Sunflower of Ben Lomond .....            | 256-75     | 3 & 4        | 40        | 296-75 |                                                                                     |
| Flirt of Northfield .....                | 49-98      | 2 & 3        | 60        | 109-98 | Worst 25 per cent.<br>of herd                                                       |
| Janet of Ben Lomond .....                | 35-57      | 3 & 4        | 40        | 75-57  |                                                                                     |
| Limelight's Janet of Northfield .....    | 85-83      | 2 & 3        | 60        | 145-83 |                                                                                     |



*Results of Competition for Gold Medal for Highest Herd Butterfat Average—continued.*

| Name of Cow.                       | Butterfat. | Age Between. | Handicap. | Total. | Remarks.                                                                        |
|------------------------------------|------------|--------------|-----------|--------|---------------------------------------------------------------------------------|
|                                    | Lbs.       | Years.       |           | Lbs.   |                                                                                 |
| <i>H. T. Kleeman, Mypolonga—</i>   |            |              |           |        |                                                                                 |
| Henley Bountiful Eileen .....      | 257-01     | 4 & 5        | 20        | 277-01 | Total butterfat,<br>2,120-53lbs.<br>6 cows averaged<br>353-42lbs.<br>butterfat  |
| Dairymaid 22nd of Lilydale ....    | 409-17     | Mature       | —         | 409-17 |                                                                                 |
| Henley Eileen Alidia .....         | 339-51     | 4 & 5        | 20        | 359-51 |                                                                                 |
| Cliffside Flower Rosey .....       | 423-61     | Mature       | —         | 423-61 |                                                                                 |
| Henley Fobes Pietje .....          | 319-57     | 4 & 5        | 20        | 339-57 |                                                                                 |
| Violet 6th of Belvoir .....        | 311-66     | Mature       | —         | 311-66 |                                                                                 |
| <i>H. B. Kuchel, Murray Bridge</i> |            |              |           |        |                                                                                 |
| Cloud of Toora .....               | 245-89     | 2 & 3        | 60        | 305-89 | Total butterfat,<br>2,517-09lbs.<br>8 cows averaged<br>314-64lbs.<br>butterfat  |
| Gayboy's Duchess of Wangana .      | 278-90     | Mature       | —         | 278-90 |                                                                                 |
| Janet of Eastview .....            | 296-44     | 4 & 5        | 20        | 316-44 |                                                                                 |
| Lester's Pearl of Toora .....      | 274-96     | 3 & 4        | 40        | 314-96 |                                                                                 |
| Lanka's Sunflower of the Bluff ..  | 222-63     | 2 & 3        | 60        | 282-63 |                                                                                 |
| Lester's Model's Dawn .....        | 255-70     | 2 & 3        | 60        | 315-70 |                                                                                 |
| Waratah II. of Loch Willow Farm    | 375-70     | Mature       | —         | 375-70 |                                                                                 |
| Waratah's Sunshade of the Bluff    | 266-87     | 2 & 3        | 60        | 326-87 |                                                                                 |
| Gem 16th of Darbalaria .....       | 258-18     | 4 & 5        | 20        | 278-18 | Worst 25 per cent.<br>of herd                                                   |
| Jewel of Toora .....               | 218-74     | 2 & 3        | 60        | 278-74 |                                                                                 |
| <i>Government Farm, Kybybolite</i> |            |              |           |        |                                                                                 |
| Kyby Airlie.....                   | 259-13     | 2 & 3        | 60        | 319-13 | Total butterfat,<br>7,716-96lbs.<br>25 cows averaged<br>308-68lbs.<br>butterfat |
| Amara of Kybybolite .....          | 274-33     | Mature       | —         | 274-33 |                                                                                 |
| Arguta of Kybybolite .....         | 323-28     | Mature       | —         | 323-28 |                                                                                 |
| Aurea of Kybybolite .....          | 311-49     | Mature       | —         | 311-49 |                                                                                 |
| Kyby Barbara .....                 | 207-57     | 3 & 4        | 40        | 247-57 |                                                                                 |
| Blanche of Kybybolite .....        | 273-39     | Mature       | —         | 273-39 |                                                                                 |
| Kyby Bonny.....                    | 290-26     | 4 & 5        | 20        | 310-26 |                                                                                 |
| Kyby Bonny Lass .....              | 219-92     | 2 & 3        | 60        | 279-92 |                                                                                 |
| Kyby Heather .....                 | 337-49     | 2 & 3        | 60        | 397-49 |                                                                                 |
| Kyby Ina .....                     | 334-18     | 2 & 3        | 60        | 394-18 |                                                                                 |
| Kyby Isis .....                    | 227-78     | 2 & 3        | 60        | 287-78 |                                                                                 |
| Julia of Kybybolite .....          | 221-28     | 4 & 5        | 20        | 241-28 |                                                                                 |
| Kyby Leucantha .....               | 247-16     | 4 & 5        | 20        | 267-16 |                                                                                 |
| Lissanthe of Kybybolite .....      | 289-36     | Mature       | —         | 289-36 |                                                                                 |
| Kyby Minna .....                   | 271-70     | 3 & 4        | 40        | 311-70 |                                                                                 |
| Kyby Miranda .....                 | 301-18     | 4 & 5        | 20        | 321-18 |                                                                                 |
| Oakbank Alleyne .....              | 313-13     | 4 & 5        | 20        | 333-13 |                                                                                 |
| Kyby Paulina .....                 | 337-81     | 4 & 5        | 20        | 357-81 |                                                                                 |
| Rose of Kybybolite .....           | 310-31     | Mature       | —         | 310-31 |                                                                                 |
| Rose II. of Kybybolite .....       | 278-07     | Mature       | —         | 278-07 |                                                                                 |
| Kyby Rosebud .....                 | 218-89     | 3 & 4        | 40        | 258-89 |                                                                                 |
| Kyby Roseleaf .....                | 297-99     | 2 & 3        | 60        | 357-99 |                                                                                 |
| Kyby Snowball .....                | 224-69     | 3 & 4        | 40        | 264-69 |                                                                                 |
| Kyby Snowflake.....                | 224-74     | 3 & 4        | 40        | 264-74 |                                                                                 |
| Topaz of Kybybolite .....          | 441-83     | Mature       | —         | 441-83 |                                                                                 |
| Kyby Boronia .....                 | 128-91     | 2 & 3        | 60        | 188-91 | Worst 25 per cent.<br>of herd                                                   |
| Clytie of Kybybolite .....         | 209-76     | 4 & 5        | 20        | 229-76 |                                                                                 |
| Kyby Countess 4th .....            | 161-21     | 2 & 3        | 60        | 221-21 |                                                                                 |
| Daphne of Kybybolite .....         | 168-54     | Mature       | —         | 168-54 |                                                                                 |
| Kyby Juliet .....                  | 166-79     | 2 & 3        | 60        | 226-79 |                                                                                 |
| Loranthé of Kybybolite .....       | 187-82     | 4 & 5        | 20        | 207-82 |                                                                                 |
| Ruby of Kybybolite .....           | 244-80     | Mature       | —         | 244-80 |                                                                                 |
| Kyby Viola .....                   | 141-01     | 2 & 3        | 60        | 201-01 |                                                                                 |



*Results of Competition for Gold Medal for Highest Herd Butterfat Average—continued.*

| Name of Cow.                            | Butterfat. | Age Between. | Handicap. | Total. | Remarks.                                                                   |
|-----------------------------------------|------------|--------------|-----------|--------|----------------------------------------------------------------------------|
| <i>C. J. Morris, Monteith—</i>          | Lbs.       | Years.       |           | Lb.    |                                                                            |
| Murray Glen Griselda Olda .....         | 498-54     | 3 & 4        | 40        | 538-54 | Total butterfat, 4,966-90lbs.<br><br>10 cows averaged 496-69lbs. butterfat |
| Murray Glen Griselda Topsey .....       | 441-72     | Mature       | —         | 441-72 |                                                                            |
| Murray Glen Inka Topsey .....           | 396-15     | 2 & 3        | 60        | 456-15 |                                                                            |
| Murray Glen Inka Tulip .....            | 469-78     | Mature       | —         | 469-78 |                                                                            |
| Olda III. of East View .....            | 423-18     | Mature       | —         | 423-18 |                                                                            |
| Murray Glen Princess Hauraki .....      | 462-09     | Mature       | —         | 462-09 |                                                                            |
| Murray Glen Segis Inka .....            | 452-99     | 3 & 4        | 40        | 492-99 |                                                                            |
| Henley Sylvia Butterfly .....           | 577-38     | Mature       | —         | 577-38 |                                                                            |
| Murray Glen Sylvia Patch .....          | 605-84     | 4 & 5        | 20        | 625-84 | Worst 25 per cent. of herd                                                 |
| Henley Tulip III. ....                  | 479-23     | Mature       | —         | 479-23 |                                                                            |
| Murray Glen Echo Patch .....            | 311-94     | 1 & 2        | 80        | 391-94 |                                                                            |
| Murray Glen Echo Sylvia .....           | 320-66     | 3 & 4        | 40        | 360-66 | Total butterfat, 3,929-31lbs.<br><br>10 cows averaged 392-93lbs. butterfat |
| Murray Glen Princess Royal .....        | 352-88     | 2 & 3        | 60        | 412-88 |                                                                            |
| <i>H. Mountstephen, Monteith—</i>       |            |              |           |        |                                                                            |
| East View Dorrain Pauline .....         | 381-74     | 4 & 5        | 20        | 401-74 |                                                                            |
| Glenowie Echo Posch .....               | 369-29     | 3 & 4        | 40        | 409-29 |                                                                            |
| Glenowie Griselda Della .....           | 290-01     | 2 & 3        | 60        | 350-01 |                                                                            |
| Glenowie Griselda Pontiac .....         | 355-30     | 2 & 3        | 60        | 415-30 |                                                                            |
| Glenowie Griselda Posch .....           | 355-68     | 4 & 5        | 20        | 375-68 |                                                                            |
| Netherland Duchess of Lydholme .....    | 426-20     | Mature       | —         | 426-20 | Worst 25 per cent. of herd                                                 |
| Glenowie Patch Princess .....           | 267-20     | 1 & 2        | 80        | 347-20 |                                                                            |
| Glenowie Pietertje De Kol .....         | 305-59     | 2 & 3        | 60        | 365-59 |                                                                            |
| Henley Plus Posch .....                 | 439-73     | Mature       | —         | 439-73 |                                                                            |
| Glenowie Sylvia Patch .....             | 338-57     | 2 & 3        | 60        | 398-57 |                                                                            |
| Glenowie Echo Patch .....               | 248-68     | 2 & 3        | 60        | 308-68 |                                                                            |
| Glenowie Plus Griselda .....            | 245-40     | 2 & 3        | 60        | 305-40 | Total butterfat, 1,752-67lbs.<br><br>6 cows averaged 292-11lbs. butterfat  |
| Henley Woodcrest De Kol .....           | 345-20     | Mature       | —         | 345-20 |                                                                            |
| <i>Mrs. B. G. Neumann, Hampden—</i>     |            |              |           |        |                                                                            |
| Carnation of Oakhill .....              | 375-48     | Mature       | —         | 375-48 | Total butterfat, 1,752-67lbs.<br><br>6 cows averaged 292-11lbs. butterfat  |
| Oakhill Carnation 4th .....             | 220-60     | 2 & 3        | 60        | 280-60 |                                                                            |
| Jane of Oakhill .....                   | 159-25     | 1 & 2        | 80        | 239-25 |                                                                            |
| Jennie III. of Oakhill .....            | 229-51     | 3 & 4        | 40        | 269-51 |                                                                            |
| Lotus of Oakhill .....                  | 320-74     | Mature       | —         | 320-74 |                                                                            |
| Pimpernel 4th of Oakhill .....          | 247-09     | 4 & 5        | 20        | 267-09 |                                                                            |
| <i>E. &amp; A. Nicholls, Woodville—</i> |            |              |           |        | Total butterfat, 2,917-51lbs.<br><br>7 cows averaged 416-79lbs. butterfat  |
| Bess of Kiama .....                     | 410-97     | 4 & 5        | 20        | 430-97 |                                                                            |
| Bess II. of Kiama .....                 | 326-51     | 3 & 4        | 40        | 366-51 |                                                                            |
| Mayflower II. of Kiama .....            | 314-51     | 3 & 4        | 40        | 354-51 |                                                                            |
| Mayflower 6th of Greyleigh .....        | 461-98     | Mature       | —         | 461-98 |                                                                            |
| Olive III. of Kiama .....               | 313-00     | 2 & 3        | 60        | 373-00 |                                                                            |
| Primrose III. of Illawah .....          | 421-03     | Mature       | —         | 421-03 |                                                                            |
| Robin 5th of Glenburn .....             | 509-51     | Mature       | —         | 509-51 |                                                                            |
| Clarice III. of East View .....         | 296-78     | 4 & 5        | 20        | 316-78 | Worst 25 per cent. of herd                                                 |
| Pembroke's Roma of Kiama .....          | 271-92     | 2 & 3        | 60        | 331-92 |                                                                            |
| <i>J. T. Oates, Kangaroo Flat—</i>      |            |              |           |        |                                                                            |
| Chevellette of Carrickalinga .....      | 365-91     | Mature       | —         | 365-91 | Total butterfat, 3,671-18lbs.<br><br>11 cows averaged 333-74lbs. butterfat |
| Cymbal of Linden .....                  | 314-34     | Mature       | —         | 314-34 |                                                                            |
| Kangaroo Flat Cymbal .....              | 262-61     | 2 & 3        | 60        | 322-61 |                                                                            |
| Grey Bramble of Eden Park .....         | 208-57     | 2 & 3        | 60        | 268-57 |                                                                            |
| Heroine of Kangaroo Flat .....          | 349-25     | 3 & 4        | 40        | 389-25 |                                                                            |
| Kangaroo Flat Lassie .....              | 244-35     | 1 & 2        | 80        | 324-35 |                                                                            |
| Lassie Fowler 5th of W. F. ....         | 285-72     | Mature       | —         | 285-72 |                                                                            |
| Princess of Kangaroo Flat .....         | 333-07     | 2 & 3        | 60        | 393-07 |                                                                            |
| Princess 6th of Willow Farm .....       | 359-39     | Mature       | —         | 359-39 | Worst 25 per cent. of herd                                                 |
| Kangaroo Flat Queenbird .....           | 247-77     | 2 & 3        | 60        | 307-77 |                                                                            |
| Queenbird 4th of Eden Park .....        | 320-20     | 4 & 5        | 20        | 340-20 |                                                                            |
| Heroine of Dalebank .....               | 241-52     | Mature       | —         | 241-52 | Worst 25 per cent. of herd                                                 |
| Kangaroo Flat Heroine II. ....          | 147-45     | 2 & 3        | 60        | 207-45 |                                                                            |
| Dalebank Rhodora 5th .....              | 88-85      | 2 & 3        | 60        | 148-85 |                                                                            |



*Results of Competition for Gold Medal for Highest Herd Butterfat Average—continued.*

| Name of Cow.                      | Butterfat. | Age Between. | Handicap. | Total. | Remarks.                                                                            |
|-----------------------------------|------------|--------------|-----------|--------|-------------------------------------------------------------------------------------|
|                                   | Lbs.       | Years.       |           | Lbs.   |                                                                                     |
| J. A. J. Pfitzner, Hampden—       |            |              |           |        |                                                                                     |
| Carnation of Hampden .....        | 409-00     | 3 & 4        | 40        | 449-00 | Total butterfat,<br>5,181-21lbs.<br><br>12 cows averaged<br>431-76lbs.<br>butterfat |
| Jane of Koorali .....             | 401-84     | Mature       | —         | 401-84 |                                                                                     |
| Werrina Jessie .....              | 380-85     | 3 & 4        | 40        | 420-85 |                                                                                     |
| Mariposa of Hampden .....         | 414-09     | Mature       | —         | 414-09 |                                                                                     |
| May of Hampden .....              | 472-22     | Mature       | —         | 472-22 |                                                                                     |
| Hampden Maybee .....              | 451-63     | 3 & 4        | 40        | 491-63 |                                                                                     |
| Mayflower of Hampden .....        | 534-81     | Mature       | —         | 534-81 |                                                                                     |
| Princess of Hampden .....         | 352-00     | 4 & 5        | 20        | 372-00 |                                                                                     |
| Queen of Hampden .....            | 368-60     | Mature       | —         | 368-60 |                                                                                     |
| Hampden Rae .....                 | 308-24     | 1 & 2        | 80        | 388-24 |                                                                                     |
| Ruby of Hampden .....             | 418-38     | Mature       | —         | 418-38 | Worst 25 per cent.<br>of herd                                                       |
| Winnie of Hampden .....           | 409-55     | 3 & 4        | 40        | 449-55 |                                                                                     |
| Werrina Jessica .....             | 219-59     | 2 & 3        | 60        | 279-59 |                                                                                     |
| Hampden King's Carnation .....    | 211-55     | 1 & 2        | 80        | 291-55 |                                                                                     |
| Maid of Hampden .....             | 234-43     | 2 & 3        | 60        | 294-43 |                                                                                     |
| Agricultural College, Roseworthy— |            |              |           |        |                                                                                     |
| Roseworthy Erudite .....          | 598-71     | 4 & 5        | 20        | 618-71 | Total butterfat,<br>5,742-01lbs.<br><br>15 cows averaged<br>382-80lbs.<br>butterfat |
| Roseworthy Fairy .....            | 437-87     | 4 & 5        | 20        | 457-87 |                                                                                     |
| Roseworthy Flora .....            | 362-70     | 3 & 4        | 40        | 402-70 |                                                                                     |
| Roseworthy Lady .....             | 341-89     | Mature       | —         | 341-89 |                                                                                     |
| Roseworthy Lady II. ....          | 289-05     | 3 & 4        | 40        | 329-05 |                                                                                     |
| Dalebank Pretty may .....         | 265-94     | 2 & 3        | 60        | 325-94 |                                                                                     |
| Roseworthy Princess 14th .....    | 335-84     | 4 & 5        | 20        | 355-84 |                                                                                     |
| Roseworthy Princess 16th .....    | 292-58     | Mature       | —         | 292-58 |                                                                                     |
| Roseworthy Princess 17th .....    | 382-15     | 4 & 5        | 20        | 402-15 |                                                                                     |
| Roseworthy Princess 18th .....    | 363-23     | 3 & 4        | 40        | 403-23 |                                                                                     |
| Roseworthy Princess 20th .....    | 320-87     | 3 & 4        | 40        | 360-87 |                                                                                     |
| Roseworthy Princess 25th .....    | 322-88     | 2 & 3        | 60        | 382-88 |                                                                                     |
| Roseworthy Princess 26th .....    | 332-85     | 2 & 3        | 60        | 392-85 |                                                                                     |
| Roseworthy Sunbeam .....          | 269-37     | 2 & 3        | 60        | 329-37 |                                                                                     |
| Roseworthy Sunlight .....         | 346-08     | Mature       | —         | 346-08 |                                                                                     |
| Roseworthy Dawn .....             | 258-80     | 2 & 3        | 60        | 318-80 | Worst 25 per cent.<br>of herd                                                       |
| Roseworthy Moonlight .....        | 257-28     | Mature       | —         | 257-28 |                                                                                     |
| Roseworthy Princess 21st .....    | 215-85     | 3 & 4        | 40        | 255-85 |                                                                                     |
| Roseworthy Princess 24th .....    | 204-20     | 2 & 3        | 60        | 264-20 |                                                                                     |
| H. D. Secomb & Son, Two Wells—    |            |              |           |        |                                                                                     |
| West Kilbride Bright Bloom ...    | 268-74     | Mature       | —         | 268-74 | Total butterfat,<br>2,230-56lbs.<br><br>7 cows averaged<br>318-65lbs.<br>butterfat  |
| West Kilbride Cinderella .....    | 246-89     | 2 & 3        | 60        | 306-89 |                                                                                     |
| West Kilbride Fancy Floss .....   | 287-61     | 2 & 3        | 60        | 347-61 |                                                                                     |
| West Kilbride Favourite .....     | 270-74     | 2 & 3        | 60        | 330-74 |                                                                                     |
| West Kilbride Florette .....      | 398-07     | Mature       | —         | 398-07 |                                                                                     |
| West Kilbride Lynette .....       | 309-74     | Mature       | —         | 309-74 |                                                                                     |
| West Kilbride Wynette .....       | 248-77     | 4 & 5        | 20        | 268-77 |                                                                                     |
| West Kilbride Fancy Fern .....    | 225-84     | 3 & 4        | 40        | 265-84 | Worst 25 per cent.<br>of herd                                                       |
| West Kilbride Fancy Girl .....    | 248-00     | Mature       | —         | 248-00 |                                                                                     |



*Results of Competition for Gold Medal for Highest Herd Butterfat Average—continued.*

| Name of Cow.                           | Butterfat. | Age Between. | Handicap. | Total. | Remarks.                                                                            |
|----------------------------------------|------------|--------------|-----------|--------|-------------------------------------------------------------------------------------|
|                                        | Lbs.       | Years.       |           | Lbs.   |                                                                                     |
| <i>H. H. Shillabeer, West Croydon—</i> |            |              |           |        |                                                                                     |
| Fanny of Swanlea .....                 | 406-59     | Mature       | —         | 406-59 | Total butterfat,<br>7,381-74lbs.<br><br>22 cows averaged<br>335-53lbs.<br>butterfat |
| Favourite of Hill View .....           | 375-63     | Mature       | —         | 375-63 |                                                                                     |
| Fortune 1st of East View .....         | 240-29     | Mature       | —         | 240-29 |                                                                                     |
| Fortune 2nd of East View .....         | 275-83     | 3 & 4        | 40        | 315-83 |                                                                                     |
| Fortune 3rd of East View .....         | 289-02     | 3 & 4        | 40        | 329-02 |                                                                                     |
| Gladstone II. of East View .....       | 294-77     | Mature       | —         | 294-77 |                                                                                     |
| Gladstone III. of East View .....      | 185-83     | 2 & 3        | 60        | 245-83 |                                                                                     |
| Gold of East View .....                | 290-94     | 3 & 4        | 40        | 330-94 |                                                                                     |
| Heather of East View .....             | 382-53     | 3 & 4        | 40        | 422-53 |                                                                                     |
| Lady Mariner .....                     | 267-26     | 2 & 3        | 60        | 317-26 |                                                                                     |
| Lucky Faith II. ....                   | 342-35     | 4 & 5        | 20        | 362-35 |                                                                                     |
| Lucky Prettymaid III. ....             | 398-80     | 3 & 4        | 40        | 438-80 |                                                                                     |
| Maude V. of East View .....            | 315-80     | 4 & 5        | 20        | 335-80 |                                                                                     |
| Pansy II. of East View .....           | 342-61     | 4 & 5        | 20        | 362-61 |                                                                                     |
| Peach of East View .....               | 281-77     | Mature       | —         | 281-77 |                                                                                     |
| Penguin of East View .....             | 241-19     | 3 & 4        | 40        | 281-19 |                                                                                     |
| Plover of East View .....              | 323-17     | Mature       | —         | 323-17 |                                                                                     |
| Posey of East View .....               | 213-60     | 2 & 3        | 60        | 273-60 |                                                                                     |
| Princess III. of Hill View .....       | 410-59     | Mature       | —         | 410-59 |                                                                                     |
| Venus II. of East View .....           | 341-59     | Mature       | —         | 341-59 |                                                                                     |
| Venus III. of East View .....          | 426-13     | 4 & 5        | 20        | 446-13 |                                                                                     |
| Viola II. of East View .....           | 245-45     | Mature       | —         | 245-45 |                                                                                     |
| Gladstone 1st of East View .....       | 90-27      | Mature       | —         | 90-27  | Worst 25 per cent.<br>of herd                                                       |
| Lulu II. of East View .....            | 92-45      | 2 & 3        | 60        | 152-45 |                                                                                     |
| Marion III. of Hill View .....         | 33-54      | Mature       | —         | 33-54  |                                                                                     |
| Pheasant of East View .....            | 143-93     | 2 & 3        | 60        | 203-93 |                                                                                     |
| Phyllis of East View .....             | 112-30     | 2 & 3        | 60        | 172-30 |                                                                                     |
| Pride of East View .....               | 187-92     | 3 & 4        | 40        | 227-92 |                                                                                     |
| Virginia of East View .....            | 79-01      | 2 & 3        | 60        | 139-01 |                                                                                     |
| <i>A. B. Sieber, Eudunda—</i>          |            |              |           |        |                                                                                     |
| Bonnie Lotus of Pella .....            | 485-54     | 2 & 3        | 60        | 545-54 | Total butterfat,<br>2,761-69lbs.<br><br>6 cows averaged<br>460-28lbs.<br>butterfat  |
| Dora of Pella .....                    | 503-71     | Mature       | —         | 503-71 |                                                                                     |
| Doreen of Pella .....                  | 390-74     | 2 & 3        | 60        | 450-74 |                                                                                     |
| Pella Lady Lotus .....                 | 342-74     | 2 & 3        | 60        | 402-74 |                                                                                     |
| Princess Audrey of Pella .....         | 424-26     | Mature       | —         | 424-26 |                                                                                     |
| Rosy of Gum Hill .....                 | 434-70     | Mature       | —         | 434-70 |                                                                                     |
| Woorora Starbright Doris .....         | 246-43     | 1 & 2        | 80        | 326-43 | Worst 25 per cent.<br>of herd                                                       |
| <i>E. O. Traeyer, Eudunda—</i>         |            |              |           |        |                                                                                     |
| Lady Alice of Fernden .....            | 318-70     | 4 & 5        | 20        | 338-70 | Total butterfat,<br>2,181-12lbs.<br><br>6 cows averaged<br>363-52lbs.<br>butterfat  |
| Fernden Lady Beth .....                | 253-71     | 2 & 3        | 60        | 313-71 |                                                                                     |
| Lady Fern of Fernden .....             | 493-32     | Mature       | —         | 493-32 |                                                                                     |
| Fernden Lady Twylsh .....              | 309-72     | 1 & 2        | 80        | 389-72 |                                                                                     |
| Lottie of Fernden .....                | 304-85     | 4 & 5        | 20        | 324-85 |                                                                                     |
| Princess Madeira of Fernden ..         | 260-82     | 2 & 3        | 60        | 320-82 |                                                                                     |
| Lorna of Fernden .....                 | 219-30     | 1 & 2        | 80        | 299-30 | Worst 25 per cent.<br>of herd                                                       |
| <i>H. R. Walsh, Salisbury—</i>         |            |              |           |        |                                                                                     |
| Belle of Morella .....                 | 537-99     | Mature       | —         | 537-99 | Total butterfat,<br>2,479-85lbs.<br><br>7 cows averaged<br>354-26lbs.<br>butterfat  |
| Morella Belle III. ....                | 220-66     | 1 & 2        | 80        | 309-66 |                                                                                     |
| Morella Damsel II. ....                | 266-62     | 1 & 2        | 80        | 346-62 |                                                                                     |
| Wollingurry Hero's Tulip .....         | 338-81     | 3 & 4        | 40        | 378-81 |                                                                                     |
| Starbright of Dalebank .....           | 152-08     | Mature       | —         | 152-08 |                                                                                     |
| Kelvinside Trilby's Olive .....        | 385-88     | 3 & 4        | 40        | 425-88 |                                                                                     |
| Viola III. of Dalebank .....           | 288-81     | 3 & 4        | 40        | 328-81 |                                                                                     |
| Princella of Kelvinside .....          | 221-48     | 3 & 4        | 40        | 261-48 | Worst 25 per cent.<br>of herd                                                       |
| Morella Princella .....                | 29-25      | 1 & 2        | 80        | 109-25 |                                                                                     |



## STATE OF SOUTH AUSTRALIA.

## VARIETIES OF WHEAT SOWN, SEASON 1929-1930.

[W. L. JOHNSTON, Government Statist.]

The Government Statist reports that 212 varieties of wheat were reported as sown for the wheat crop of the season 1929-1930. The total area sown for grain, hay, and fodder was 3,987,310 acres, of which the varieties sown were not specified for 141,356 acres.

Particulars of the sixteen most popular varieties are given at foot hereof. From these it will be seen that Gluyas (16.30 per cent.) and Late Gluyas (10.61 per cent.) occupy first and second place, and accounted for more than one-quarter of the total area sown. It is interesting, further, to note that one-half of the sown area was sown with the first five varieties: Gluyas, 16.3 per cent.; Late Gluyas, 10.6 per cent.; Federation, 8.7 per cent.; 7.6 per cent.; and Currawa, 7.3 per cent.; total, 50.5 per cent.

*The three leading varieties favored in each of the divisions were:—*

|                  |               | %   |                     | %   |          | %   |
|------------------|---------------|-----|---------------------|-----|----------|-----|
| Central .....    | Nabawa ....   | 13  | Gluyas .....        | 12½ | Ford ... | 11  |
| Lower North ...  | Federation .. | 13  | Nabawa .....        | 13  | Gluyas.. | 10½ |
| Upper North ...  | Federation .. | 30  | Gluyas .....        | 10  | Daphne . | 9   |
| South-Eastern .. | Federation .. | 36½ | Huff's Imperial ... | 14  | Major... | 10½ |
| Western .....    | Late Gluyas . | 27  | Gluyas .....        | 25  | Ford ... | 6   |
| Murray Mallee .. | Gluyas.....   | 16½ | Currawa .....       | 9½  | Sultan . | 9   |

*Varieties Increased.*—The following leading varieties show increases:—Nabawa, 288,878 (116,220) acres; Gallipoli, 72,520 (39,581); Waratah, 47,677 (26,631); Late Gluyas, 423,116 (331,737); King's White, 41,256 (34,337); and of the lesser: Aussie, 11,409 (5,206); Bena, 15,706 (7,457); Ghurka 3,258 (918); Huguenot, 8,044 (3,580); and others.

*Varieties Decreased.*—Federation, 347,738 (393,293); Ford, 304,296 (376,451); Currawa, 291,012 (325,480); also Yandilla King, Silver Bart, Minister, Queen Pau, and others.

*Sixteen Leading Varieties of Wheat Sown 1929-1930 and 1928-1929.*

| Kind of Wheat.      | Total Area Sown for<br>Grain, Hay, Etc. |           | Percentage to<br>Total. |          | Relative<br>Position. |          |
|---------------------|-----------------------------------------|-----------|-------------------------|----------|-----------------------|----------|
|                     | 1929-30.                                | 1928-29.  | 1929-30.                | 1928-29. | 1929-30.              | 1928-29. |
|                     | Acres.                                  | Acres.    | %                       | %        |                       |          |
| Gluyas .....        | 649,915                                 | 621,317   | 16.30                   | 16.46    | 1                     | 1        |
| Late Gluyas .....   | 423,116                                 | 331,737   | 10.61                   | 8.78     | 2                     | 4        |
| Federation .....    | 347,738                                 | 393,293   | 8.73                    | 10.42    | 3                     | 2        |
| Ford .....          | 304,296                                 | 376,451   | 7.63                    | 9.97     | 4                     | 3        |
| Currawa .....       | 291,012                                 | 325,480   | 7.30                    | 8.62     | 5                     | 5        |
| Nabawa .....        | 288,878                                 | 116,220   | 7.24                    | 3.08     | 6                     | 8        |
| Sultan .....        | 184,081                                 | 166,019   | 4.62                    | 4.40     | 7                     | 6        |
| Caliph .....        | 159,066                                 | 165,011   | 3.99                    | 4.37     | 8                     | 7        |
| Daphne .....        | 109,018                                 | 106,624   | 2.73                    | 2.82     | 9                     | 9        |
| Gallipoli .....     | 72,520                                  | 39,581    | 1.82                    | 1.05     | 10                    | 17       |
| Joffre .....        | 65,790                                  | 66,802    | 1.65                    | 1.77     | 11                    | 10       |
| Felix .....         | 60,381                                  | 47,876    | 1.51                    | 1.27     | 12                    | 14       |
| Florence .....      | 59,372                                  | 66,052    | 1.49                    | 1.75     | 13                    | 12       |
| German Wonder .     | 59,324                                  | 66,243    | 1.49                    | 1.75     | 14                    | 11       |
| Major .....         | 54,268                                  | 55,266    | 1.36                    | 1.46     | 15                    | 13       |
| Canberra .....      | 49,897                                  | 44,506    | 1.25                    | 1.18     | 16                    | 15       |
| Other & unspecified | 808,638                                 | 787,123   | 20.28                   | 20.85    | —                     | —        |
| Total ...           | 3,987,310                               | 3,775,601 | 100.00                  | 100.00   | —                     | —        |



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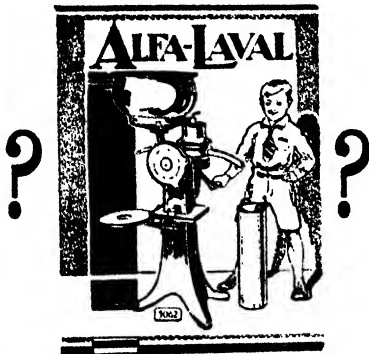
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## STATE OF SOUTH AUSTRALIA.

## TOP-DRESSING OF PASTURE LAND.

[W. L. JOHNSTON, Government Statist.]

There has been considerable expansion since 1924 in the area of pastoral land top-dressed. The following return setting forth the chief districts of the State in which lands are top-dressed has been prepared with a view to noting the effect of same on the numbers of sheep carried. In many cases it will be observed that the sheep flocks have substantially increased, and no doubt top-dressing has been the principal reason for this.

*Acreage Top-dressed.*—From a total of 67,124 acres top-dressed in 1924 the area top-dressed during the year increased to 302,114 acres in 1929. The principal districts are:—District council Onkaparinga, 4,789 acres to 12,570 acres; district council Mount Gambier, East and West, from 972 acres to 18,890 acres; district council Penola, from 4,289 acres to 20,379 acres; and district council Naracoorte, 9,796 acres to 50,614 acres.

*Manures Used.*—In the season 1924 4,080 tons of artificial fertilisers were used for top-dressing 67,124 acres, and in 1929 15,791 tons on 302,114 acres.

*Sheep Carried.*—There were 1,020,293 sheep in 1924 in the special districts tabulated when only 39,973 acres were top-dressed, and for the same districts in 1929 when the top-dressed acreage had increased to 210,295 acres the number of sheep had increased to 1,435,066.

*Principal Top-dressed Pasture Lands and Sheep Carried.*

| Selected Districts.         | Acres Top-dressed during each Year. |         |         | Number of Sheep as at December 31st each Year. |           |           |
|-----------------------------|-------------------------------------|---------|---------|------------------------------------------------|-----------|-----------|
|                             | 1924.                               | 1927.   | 1929.   | 1924.                                          | 1927.     | 1929.     |
|                             | Acres.                              | Acres.  | Acres.  | No.                                            | No.       | No.       |
| D.C. Barossa .....          | 375                                 | 1,710   | 1,396   | 8,300                                          | 14,481    | 15,066    |
| D.C. Clarendon .....        | 149                                 | 1,409   | 1,364   | 5,935                                          | 13,287    | 13,042    |
| D.C. Echunga .....          | 854                                 | 2,039   | 3,490   | 1,467                                          | 3,601     | 7,624     |
| D.C. Kondoparinga .....     | 1,276                               | 2,187   | 6,240   | 12,510                                         | 16,715    | 26,930    |
| D.C. Mount Crawford .....   | 510                                 | 872     | 1,465   | 15,530                                         | 17,958    | 20,474    |
| D.C. Onkaparinga .....      | 4,789                               | 8,975   | 12,570  | 21,317                                         | 21,657    | 32,037    |
| D.C. Talunga .....          | 1,346                               | 4,073   | 6,377   | 13,783                                         | 18,228    | 28,338    |
| D.C. Encounter Bay .....    | 2,058                               | 5,536   | 8,714   | 18,780                                         | 24,448    | 32,835    |
| D.C. Macclesfield .....     | 1,500                               | 3,379   | 4,134   | 8,975                                          | 12,663    | 15,797    |
| D.C. Mount Barker .....     | 3,778                               | 8,474   | 9,524   | 11,848                                         | 23,096    | 33,655    |
| D.C. Port Elliot .....      | 802                                 | 4,367   | 8,597   | 30,835                                         | 39,671    | 42,556    |
| D.C. Yankalilla .....       | 610                                 | 3,149   | 9,979   | 42,915                                         | 59,125    | 68,780    |
| D.C. Angaston .....         | 850                                 | 4,333   | 4,423   | 20,062                                         | 30,736    | 31,144    |
| Hd. Tatiara .....           | 681                                 | 5,034   | 6,033   | 63,066                                         | 62,851    | 72,305    |
| Hd. Wirrega .....           | 792                                 | 5,504   | 8,168   | 44,689                                         | 53,269    | 58,721    |
| D.C. Benara .....           | 721                                 | 3,181   | 4,747   | 36,901                                         | 37,329    | 47,602    |
| D.C. Millicent .....        | 2,244                               | 3,855   | 5,863   | 48,156                                         | 57,083    | 66,007    |
| D.C. Mount Gambier East ..  | 779                                 | 3,487   | 10,805  | 59,950                                         | 70,080    | 73,556    |
| D.C. Mount Gambier West ..  | 193                                 | 2,590   | 8,085   | 35,737                                         | 52,303    | 55,106    |
| D.C. Penola .....           | 4,289                               | 12,355  | 20,379  | 148,813                                        | 169,695   | 183,416   |
| D.C. Port MacDonnell .....  | 55                                  | 1,235   | 7,495   | 53,666                                         | 64,654    | 79,620    |
| Hd. Conmurra .....          | 255                                 | 2,850   | 4,675   | 26,725                                         | 30,283    | 35,254    |
| Hd. Joyce .....             | 190                                 | 1,577   | 2,514   | 14,989                                         | 28,346    | 23,927    |
| D.C. Naracoorte .....       | 9,796                               | 29,960  | 50,644  | 246,852                                        | 262,658   | 328,130   |
| Hd. Shannon .....           | 530                                 | 1,053   | 1,140   | 6,685                                          | 9,355     | 11,232    |
| Hd. Baker .....             | 554                                 | 945     | 1,474   | 15,807                                         | 13,711    | 26,912    |
| Total special districts ... | 39,976                              | 124,129 | 210,295 | 1,020,293                                      | 1,207,883 | 1,430,066 |
| Total State .....           | 67,124                              | 209,922 | 302,114 | 6,350,240                                      | 7,542,345 | 6,186,252 |



## TOMATO DISEASES IN SOUTH AUSTRALIA AND HOW TO CONTROL THEM

with special reference to Glasshouse Tomato Culture.

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[Continued from page 166, *Journal of Agriculture*, September, 1930.]

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### THE NATURE OF DISEASE.

Diseases may be of the following kinds:—

**VIRUS DISEASES**, in which an infective sap is transmitted from plant to plant either directly on the fingers of workers (*e.g.*, *Mosaic* and *Streak* diseases) or by means of insects (*e.g.*, *Spotted Wilt*, carried by the black carnation thrips).

**BACTERIAL DISEASES**, in which minute living organisms, the bacteria, infect plants and multiply inside them in immense numbers. They may be transmitted on the fingers of pruners or gain entrance from the soil through wounded roots (*e.g.*, *Bacterial Wilt* disease).

**FUNGUS DISEASES**, in which the disease results from the attack of parasitic moulds or micro-fungi. These parasitic fungi may attack the roots (*e.g.*, *Verticillium Wilt*); or the stems of seedlings at ground level (*e.g.*, *Damping-off*); or the leaves (*e.g.*, *Leaf Spot* and *Early Blight*); or the fruit (*e.g.*, *Phoma fruit-rot*). Fungus diseases are usually spread by minute spores, which may be blown about in the air, or be carried in water or soil.

**NON-PARASITIC DISEASES**, a miscellaneous group of troubles in which may be placed for convenience any abnormal condition which is not due to the attack of some definite parasitic or infectious organism, such as a virus, bacterium or fungus (*e.g.*, *Blossom End Rot*, *Sunburn*, &c.).

**EEL-WORMS** or **NEMATODES**, which attack the roots, causing big clubby swellings. The eel-worms last over from season to season as eggs in the soil.

**INSECT PESTS**, the best known of which to the tomato grower are the "white fly" and the "green caterpillar."

### VIRUS DISEASES.

Virus diseases are becoming an extremely important class of disease, as the severity of tomato spotted wilt in Australia and of sugar-beet curly-top and aster yellows in America, as well as many other diseases of economic importance, will bear witness. Virus diseases are also particularly difficult to investigate, because the casual agent, whatever it is, is so small that it cannot be seen with the highest powers of the microscope. We know, however, that the sap from a diseased plant, when it is inoculated into a healthy plant, will cause the disease to appear in this healthy plant after an "incubation period" of about seven to 14 days.



The infectiveness of the sap varies very much in different virus diseases. In tomato and tobacco *mosaic* and in tomato *streak* it is very infective, and the small amount which might be carried on the fingers after pruning a diseased plant would be quite sufficient to give the disease to several healthy plants pruned immediately afterwards without washing the hands.

In other cases, however, and particularly those cases in which an insect is the carrier of the disease, the sap does not appear to be very infective directly on the fingers. In fact, in the case of aster yellows, it is said that the disease cannot be transmitted in any other way than by the insect carrier, which is a leaf-hopper. Tomato spotted with wilt falls in this class, and practically the whole of the spread of the disease in South Australia is the result of the sucking activities of the black carnation thrips, which is the special insect vector of this disease.

*Control methods* for virus diseases must be based upon our knowledge of these points particularly :—

- (1) A diseased plant is full of an infective sap.
- (2) This may be carried on the fingers and infect healthy plants in some cases, or
- (3) It may be carried about by some sucking insect.
- (4) A plant which has been infected by fingers or by insect bite shows no symptoms for the first 10 to 14 days or so, although its sap may be already infective during this time.
- (5) Plants of closely related families or weeds may carry the virus also.

The information given in these five points would suggest the following methods for the control of virus diseases in general in tomato glasshouses (further details are given in the separate treatment of each disease) :—

- (1) Keep a keen eye open for diseased plants. Unfortunately it is often the most vigorous plants which become affected. When the earliest symptoms of a virus disease are noticed mark the affected plants, but do not touch them until the end of the day.
- (2) At the end of the day remove all marked plants carefully and bury them or burn them. Then wash the hands with soap and water, and replace with healthy seedlings.
- (3) Control insects by spraying or dusting with nicotine sprays or dusts.
- (4) Do not prune for a fortnight after virus diseases are noticed, but continue to mark and replace affected plants each day and control insects. The plants which become affected during this fortnight were probably already infected when the first ones were noticed, and the idea of a fortnight's cessation of pruning is to avoid the possibility of carrying on the sap from such infected plants which are still in the "incubation period" and not yet showing symptoms.
- (5) Avoid growing potatoes near the glasshouse, and also keep down all weeds, especially those closely related to the tomato, such as black nightshade.

The buying of seedlings raised on some other property always brings with it the risk of introduction of virus diseases, as well as of other diseases.



## BACTERIAL DISEASES.

Bacteria are exceedingly minute living organisms. Those which attack plants have a simple rod-shaped form (Fig. 1a). When under suitable conditions for growth they multiply by dividing into two; soon each of the two divides into two again, so that there are four; and so on. Starting with one bacterium, if it divides into two in half an hour, and the progeny continue to divide every half-hour, at the end of 24 hours there would be 280,000,000,000,000. Actually, of course, competition for food would take place before such numbers were reached, but they serve to show the immense powers of reproduction of these lowly organisms.

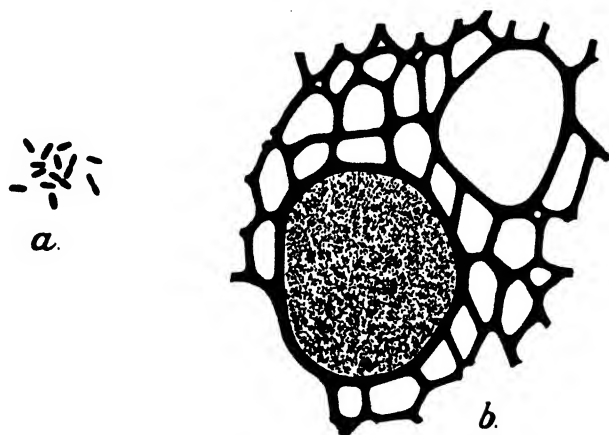


FIG. 1. (a) A small group of bacteria, showing their rod-shaped form and how they multiply by dividing into two. Magnified 2,000 times.

(b) Part of a thin section across the stem of a tomato plant diseased with bacterial wilt. Magnified 250 times, so that only a very few of the cells can be shown; at this magnification the whole stem would be 10ft. across and a 1,000ft. high. The section passes across the cavity of two of the water-conducting vessels as well as across a number of the smaller strengthening cells. One of the water-conducting vessels has been blocked up by masses of bacteria. In a diseased plant on this scale columns of bacteria might extend in the water conducting tubes for 500ft. to 1,000ft. up the plant as thickly massed as drawn; this will give a faint idea of the enormous numbers of germs in a diseased plant, and how many could stick to one's finger, which would be about as thick as the trunk of a very big tree.

There are very many kinds of bacteria. Some live only on non-living organic matter, such as those which decompose meat or those which turn milk sour, or those which bring about various chemical changes in the soil. Others are active parasites of animals or man and cause serious diseases; still others cause plant diseases. In each case, however, it is a definite species of bacterium which causes a definite disease. Among plants, for example, the bacterium which causes bacterial blight of walnuts is quite a different one from that which causes bacterial wilt of tomatoes.

If, therefore, the bacterial wilt of tomatoes appears in a glasshouse where it has not been seen before, the bacterium which is the cause of the disease must have been introduced there in some way—either by buying seed or seedlings from some outside infected source, or perhaps by some visitor who has previously walked through a diseased house, or by water from some infected property higher up from which drainage water comes down, or in some other way.

When disease-producing bacteria come in contact with the host plant which they normally attack, and gain entrance to the tissues inside (usually a small wound is necessary to enable them to penetrate) they multiply very rapidly. The food material which enables them to grow and multiply



is absorbed from the tissues of the host plant. The bacteria in their growth excrete ferments which dissolve the substances in the cells of the host plant, so that the infected parts soon collapse. A slimy liquid frequently oozes out when the infected part is cut across, and this liquid contains millions and millions of the bacteria. It is thus readily to be understood how a person pruning a diseased vine could get thousands of bacteria on his fingers when he pulled off a shoot, and could place some of these bacteria in a very suitable place for infection when he pulled the shoots off the next healthy plant. It is, in fact, frequently noticeable that when bacterial wilt breaks out in a house a number of plants next to one another along a row are first seen to be diseased. There is little doubt in such a case that the bacterium has been carried along on the fingers of the pruners.

*Control methods* for bacterial disease in a glasshouse must, therefore, be based mainly on strict precautions for plant hygiene in order to prevent the bacteria being carried from plant to plant. This includes removal and destruction of diseased plants as soon as seen (as described before, this should be done at the end of the day, and the hands thoroughly washed with soap afterwards); a period of cessation of pruning to allow already infected plants to show up; the avoidance of replanting in holes from which diseased plants have been removed, for the bacteria live in soil and can gain entrance through wounded roots; or, if it is particularly desired to replant, watering the soil well and watering in the seedlings with Cheshunt mixture. On no account should diseased plants be left in, and the pruners go along the rows as if no disease were there. In this way they are certain to spread the trouble to other healthy plants.

#### FUNGUS DISEASES.

The fungi which cause plant diseases are microscopic, and it is usually only their effect on the plant, such as rotting of the roots, diseased spots on the leaves, &c., &c., which makes their presence evident to the naked eye. In all such cases, however, a scientific examination under the microscope reveals the fungus which is the cause of the trouble to be present in the diseased parts.

Fungi are usually spread by microscopic "spores" which blow about in the air. These spores germinate in moisture, and the fungus threads which grow out from them are capable of penetrating and growing within a suitable host plant, thus bringing about a state of disease.

Their action can best be explained by following what happens in a specific disease. The Early Blight disease of the leaves, which will be described later, may be taken as an example. In this case the spores are very characteristic in shape (Fig. 2a), consisting of a row of brownish cells tapering to a long point. They are too small to be seen by the naked eye, however, and are readily blown about in currents of air. They can easily settle on a tomato leaf and stick to it, just as small particles of dust stick to leaves. If moisture is then deposited on the leaves, such as frequently occurs in the early morning after cold nights, the spore absorbs moisture and begins to germinate. One or more thin, delicate "germ-tubes" push out from the spore, and soon begin to penetrate the surface of the leaf (Figs. 2b and c). Once they have actually penetrated through the outer cell-wall and arrived within the cell cavity just beneath where they lie on the leaf, they can begin to absorb food material from the plant. The fungus



threads continue to grow and branch and penetrate neighboring cells, and as they grow they secrete ferments which dissolve the tissues of the plant and make them available as food to be absorbed by the fungus. The effect on the leaf is that a "diseased spot" appears, where the tissues of the leaf are collapsed, but a microscope can still reveal the threads of fungus growing within the dead tissue.

The spot gradually enlarges owing to the continued growth of the fungus. Finally comes the stage when the fungus is nearly full grown and it proceeds to form a crop of spores on special spore-bearing branches which are pushed through the surface of the leaf (Fig. 2d). Diseased spots on leaflets such as are to be shown in Fig. 23, which, of course, have each arisen from the germination of a single spore, if examined under the microscope, would be found to be covered with a crop of some hundreds

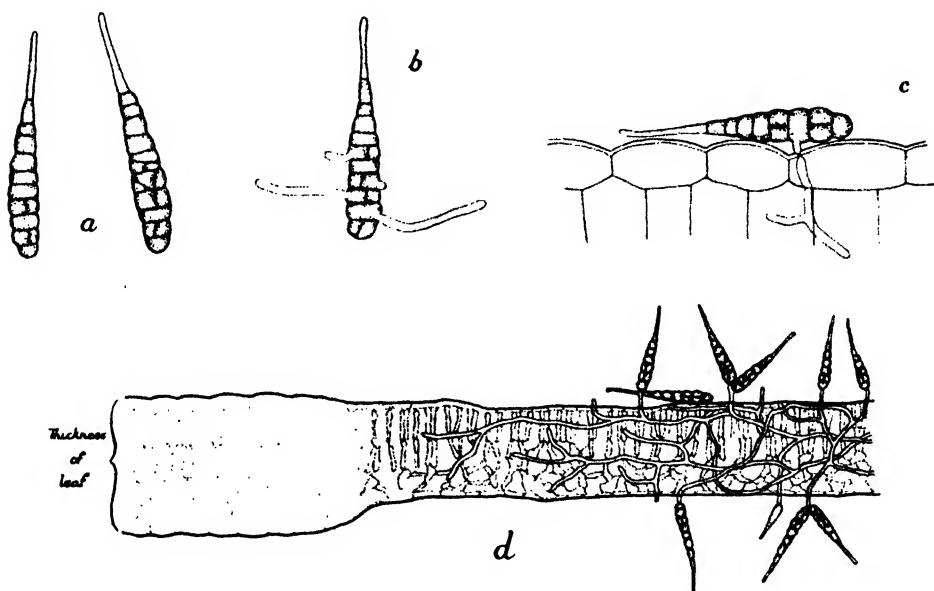


FIG. 2.—(a) Two spores of the Early Blight fungus.

(b) The way in which a spore germinates in water.

(c) The way in which the fungus penetrates into the plant. The spore is lying on the surface of the leaf, the cells of which are shown greatly magnified. It has germinated in some moisture on the surface, and the germ-tube has penetrated through the outer wall and is now growing and branching within the cells of the leaf.

(d) A thin section through the edge of a diseased spot such as one of those in Fig. 23. Healthy leaf tissue is at the left, and the shrunken tissue of the diseased spot with the fungus threads growing through it is on the right. Actually, the amount of leaf-tissue shown is about as wide as a small pin's head. The fungus has been growing for some time in the leaf and some of the fungus threads are already pushing out through the surface and forming a crop of spores over the diseased spot. At this magnification the diseased spot would be 5 ft. across, so that only the edge of it can be shown and a very few of the spores it produces. Some two to three thousand spores may be produced on a single diseased spot, which originated from infection by single fungus spore as in (c).

of fungus spores just like those in Fig. 2. These are easily detached and blown about, and are capable of germinating and reproducing the disease according to the cycle just described.

It will be easily understood from the above how a few primary infections can soon produce sufficient spores to cause quite an epidemic. It is for this reason that the tomato grower should get the habit of noticing the smallest sign of disease, so that he can take immediate steps to combat it



before it spreads too far. Even the picking off of odd diseased leaflets in the early stages may be of considerable value in control, but it becomes impossible, of course, when there are many of them.

The effectiveness of spraying for the control of fungi depends upon the fact that the healthy plant is coated all over with a fine layer of poison. This acts as a protection against infection, for if spores fall on the leaves and sufficient moisture comes to germinate them, the germ tubes absorb some of the poison and are killed before they can penetrate into the leaf. Spraying, of course, is no good after infection has occurred, for the fungus is then inside the leaf where the spray cannot reach it. Dusts act in the same way as sprays, and are often easier to apply in glasshouses. The important point to realise in using dusts and sprays is that the fungicide acts only as a protection to healthy growth, and that after a week or two when fresh growth has occurred at the top of the plant this will be unprotected by any covering of poison.

The *general control methods* for fungus diseases may therefore be set down as:—

- (1) strict attention to plant hygiene, including removal and destruction of diseased material where possible, for this may be a source of thousands of new spores. Especially at the end of the season an effort should be made to clean up as thoroughly as possible and burn all refuse;
- (2) keep a sharp look-out for the first sign of the appearance of any fungus disease; and then
- (3) put on a protective covering of spray or dust as soon as there is a possibility of a disease spreading;
- (4) try and remedy any factors which may tend to increase the spread of the disease. It is possible that something may be done to reduce the humidity, or to stop the drip of rain in certain places, or sometimes disease is worse because a susceptible variety is grown and a change of variety will be of value.

Fungus diseases are of such great variety, however, that general remarks are not sufficient, and the recommendations under each separate disease should be consulted. Soil fungi, for example, which attack the roots, cannot be checked by spraying, but the watering of Cheshunt mixture on to the soil may be of benefit in certain cases.

#### NON-PARASITIC DISEASES.

This is simply a convenient group heading for a number of troubles which are not caused by parasitic or infectious organisms, but which in most cases are due to something being wrong in the growing conditions. For example, a short period of drought may cause a rotten patch to appear at the end of a number of fruits—the so-called Blossom End Rot and various other non-parasitic troubles will be discussed in a subsequent issue.

#### CEL-WORMS.

(A special section will be devoted to cel-worms later.)



## INSECTS.

When insects attack plants they are usually referred to as *pests*, and not as *diseases*. The insect pests which worry the tomato growers may be set down as:—

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| Chewing insects | {cutworms.<br>green caterpillars or "grubs."                              |
| Sucking insects | {green aphid.<br>white fly.<br>surface mite (the cause of "golden stem"). |

Thrips (sucking insects), at least one species of which, the black carnation thrips, is responsible for spreading the spotted wilt disease, do not become sufficiently numerous in South Australia to be a pest in themselves; it is the serious nature of the virus disease which they carry and inoculate into plants which is responsible for the losses involved, and thrips as carriers of the virus are discussed under the heading of spotted wilt.

*Control Methods for Insect Pests.*—These may be briefly stated here as arsenic-containing sprays, dusts, or baits for chewing insects, and nicotine-containing sprays or dusts for sucking insects (though cyanide fumigation is more efficient against white fly).

Insecticides containing arsenic are known as *stomach poisons*, for the arsenic is taken in with the parts of the plant which are eaten, and acts as an internal poison. Insecticides containing nicotine are known as *contact poisons*, for they kill by direct action on the body. They are used because sucking insects pierce the skin of the plant and suck the juices from the inside, and would not absorb any arsenic present on the surface.

Even if some insect pest which was unknown to a grower made its appearance in his houses, therefore he should be able to apply the proper spray to control it by observing its feeding methods. If it actually ate the leaves, stems, or fruit, an arsenic spray would be indicated as the best to apply, whereas if it was merely a sucker a nicotine spray would be best to try first. If these methods were not satisfactory the grower would naturally make inquiries as to whether any scientific information was available which would aid in combating the insect in any other way.

Control is not always the simple matter of applying a single spray. The habits of the insect must frequently be taken into account, and treatments be so adjusted as to catch insects at different stages in their life-history. For example, in the treatment for white fly by fumigation, the adult and larval stages are killed but not the eggs, and a second treatment has to be done after from two to four weeks, according to the temperature, to kill adults which hatch from all the eggs present when the first fumigation was done. The details vary, of course, for each pest, and discussions will be made on the individual insect pests in a later issue.

## TOMATO DISEASES AND THEIR CONTROL.

## KEY FOR THE IDENTIFICATION OF DISEASES.

The tomato grower can only identify a disease by the symptoms which diseased plants show. These are usually perfectly definite and characteristic for each disease, and when once a disease is known there is rarely any



difficulty in recognising it again. The illustrations in this bulletin have been made from typical specimens taken from South Australian glasshouses, and should help to render identification easy. The following table of condensed descriptions of symptoms may be of further assistance in tracking down a disease to its proper cause. When the table is being used to identify a disease, if the short descriptions for the symptoms given under the sections "Leaves," "Fruit," &c., appear to agree, the longer description of the disease on the page referred to should be looked up and carefully read. If the trouble still does not seem to fit correctly any of the described diseases, it would be advisable to send a specimen for identification either to the Department of Agriculture or to the Waite Institute.

Troubles caused by insect pests, such as cutworms, stem-borers, &c., have not been included in the Table except in certain cases, such as Eelworms and Brown Surface Mite, where the insect is too small to be seen with the naked eye.

#### A. SEEDLING—

#### Disease.

- |                                                                                 |                                               |
|---------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Constriction of stem at ground level with seedling falling over (Fig. 15)    | *Damping-off.                                 |
| 2. Seedling stunted and purplish; roots rotten, brown, and dying back from tips | * <i>Verticillium</i> wilt or other root-rot. |

#### B. WHOLE PLANT—

- |                                                                                                                                     |                                               |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Becomes suddenly stunted, young leaves bronzed diffusely or in spots, or just with faint pallid spots if cold (Figs. 3, 4, 5, 8) | Spotted wilt (p. 262)                         |
| 2. Becomes slightly stunted, with young leaves rolled and with mottled yellow and green areas (Fig. 13)                             | Mosaic (p. 271)                               |
| 3. Young leaves with blackish collapsed spots or lines on them; small or large dark sunken streaks on stem or leaf stalks (Fig. 11) | Streak (p. 269)                               |
| 4. Top growth spindly, leaves yellowing from below upwards                                                                          | * <i>Verticillium</i> wilt or other root-rot. |
| 5. Whole plant wilting in warm part of day (Fig. 17) . . .                                                                          | Do.                                           |
| 6. Rank giant growth, no flowers . . . . .                                                                                          | *Buck plants                                  |
| 7. Shoots going "blind," tufted and swollen at ends (Figs. 31, 32)                                                                  | *Rosette                                      |
| 8. Rusty bronze discoloration gradually spreading up stem and out on to leaves, which slowly shrivel                                | *Brown surface mite.                          |
| 9. Becomes gradually stunted, sometimes sickly yellowish or fruit not setting properly (Figs. 34, 35)                               | *Eelworms.                                    |

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\* Illustrations and descriptions of disease will appear in a subsequent issue.



## C. LEAVES

## (a) Younger leaves only.

- |                                                                                                                                                               |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1. Distinct bronze discolorations in spots or diffuse or only so faint as to be shiny when turned towards light; occasionally only pallid circles or patches  | Spotted wilt<br>(p. 262) |
| 2. More sharply limited spots with tissue collapsed through to other side and more blackish. In spots or lines. Stem streaks also usually present. (Fig. 11.) | Streak (p. 269)          |
| 3. Young leaves rolling round considerably, hard to spread out flat; and often distinct yellow and green mottling (Fig. 13)                                   | Mosaic (p. 271)          |

## (b) Older leaves also affected.

- |                                                                                                                                    |                                               |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Small spots less than $\frac{1}{4}$ in., light-brown to ashy in centre with minute black dots in central part of spot (Fig. 21) | *Leaf-spot.                                   |
| 2. Dark spreading spots, often "zoned" (Fig. 23) . . . . .                                                                         | *Early blight.                                |
| 3. Odd leaflets dying first, shrivelling while still green (Fig. 14)                                                               | *Bacterial blight.                            |
| 4. Odd leaflets dying first, due to spread of light-brown diseased patches; sometimes tufts of mould (Fig. 24)                     | * <i>Pleospora</i> leaf blight.               |
| 5. Dark sooty growth on leaflets which will wash off, leaving leaflet with healthy tissue                                          | *Mould following aphid or white fly.          |
| 6. Rusty bronze discoloration spreading over leaves, from stem end. Leaflets gradually shrivelling                                 | *Brown surface mite.                          |
| 7. Bottom leaves yellowing gradually and later dying from margins                                                                  | * <i>Verticillium</i> wilt or other root-rot. |
| 8. Pallid tissue in centre of leaflets (Fig. 30) . . . . .                                                                         | *Pallid leaves.                               |

## D. FRUIT —

- |                                                                                                          |                                |
|----------------------------------------------------------------------------------------------------------|--------------------------------|
| 1. Large circular rotten patch at tip end of fruit (Fig. 28)                                             | *Blossom-end rot               |
| 2. A black rot starting from cracks at stem end (Fig. 27)                                                | * <i>Phoma</i> fruit rot.      |
| 3. Small "birdseye" spots with light centres (Fig. 25) .                                                 | * <i>Pleospora</i> fruit spot. |
| 4. Tough white patch on one side of fruit (Fig. 29) . . . .                                              | *Sunburn.                      |
| 5. Diffuse bronzing over skin of green fruit, which later develops fine network of cracks and scabs      | *Brown surface mite.           |
| 6. Fruit becoming soft and sloppy inside skin. This is a bacterial wet rot usually following grub injury | *See green caterpillars.       |

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\* Illustrations and descriptions of disease will appear in a subsequent issue.



## E. Roots—

1. Knotty or clubby swellings on the roots (Figs. 34, 35) \*Eelworms
2. Roots dying back from the tips, brownish, with bark easily stripping off central strand of wood. The most usual trouble is *Verticillium* wilt in which the wood becomes browned inside roots and stem; occasionally Black Dot root rot where black specks can be seen in the wood of rotted roots (Fig. 20), less frequently *Pythium* rots in which the roots die back without browning inside the stem \**Verticillium* wilt or other root-rot.

## SPOTTED WILT.

*Description.*—Spotted wilt is most serious as a disease of outdoor tomatoes, but in certain years it has caused a great deal of loss in glasshouse tomatoes, and has necessitated replanting houses even two or three times.

The main symptoms of the disease are bronzing of the younger leaves, with cessation of growth of the plant. The disease is most severe in the seedling stage, and in glasshouse work, in fact, tends to disappear as the weather warms up. (This does not mean that infected plants recover, but that as the season advances and the plants become older further infections gradually cease.)



FIG. 3.—Diseased and healthy plants of Sensation tomato, showing an early stage in the effect of spotted wilt. The diseased plant has ceased growth and has acquired a slightly bunched top with young leaves bent downwards. The young leaves have bronze markings on their upper surface.

If the weather is cold and dull the bronzing characteristic of the disease may be very difficult to detect. Sometimes it can only be seen as a faint shiny appearance on the upper surface of affected leaflets when they are turned towards the light. Under cold conditions plants frequently become only pallid in appearance, with suggestions of yellowish or whitish circular



blotches in the leaves. Bronzing as a symptom is thus most distinct, as a rule, when the plants are growing rapidly, and most indistinct when the plants are not making rapid growth for some reason. It is rarely so definite and distinct on glasshouse plants as it frequently is on outdoor plants.

In all cases, however, affected plants cease growth, and are soon readily picked out by the fact that they are "left behind" by the more rapid growth of neighboring healthy plants (Fig. 3\*). The appearance of the crown of leaves at the growing point of young plants also alters slightly, the leaves usually appearing somewhat stiffer, bent a little more downwards



FIG. 4.—Diseased and healthy tomato plants from the field showing a later stage in the effect of spotted wilt. Bronzing on the upper leaves was severe, and some of the leaflets have shrivelled. Note the marked stunting again.

than usual, and often somewhat bunched owing to the cessation of growth of the stem (Fig. 3). The first slight changes in the normal relations of the leaves at the growing point often enable affected plants in glasshouses to be noticed a day or two before the bronzing becomes definite (Fig. 8). If the plants are left in some days after they become affected they are soon noticeable by their dwarfness and by the fact that the leaves have not the good flat spread of normal plants, the leaflets often being slightly folded inwards. As stated previously, glasshouse plants do not usually continue to become affected after they have reached a height of some 18in. to 2ft. (The reason for this is obscure. It may be that old plants cannot easily be infected, or that the humidity becomes too great for the thrips, or partly, perhaps, that there is masking of symptoms due to higher temperature.)

\*Figures 3-10 are reproduced by permission of the Council for Scientific and Industrial Research from C.S.I.R. Bulletin No. 44, "Investigations on 'Spotted Wilt' of Tomatoes."



Outdoor plants may become affected at any age, and infection may continue right through the summer, though it usually diminishes in intensity after the plants are half grown. The bronzing on the young leaves usually appears suddenly while the plants are in full vigor (Fig. 5). In warm weather it may be very severe, and the affected shoots dry up in a few days, almost as if they had been scorched. The plants then present a rather unsightly appearance (Fig. 4) and produce no further useful growth or fruit during the season.



FIG. 5.—Bronze markings of spotted wilt on the upper surface of a Golden Queen leaf.

The fruit from affected plants may have more or less circular bronze-colored markings while still green (Fig. 6, but not frequent) or variously shaped yellow blotchy areas when ripe (Fig. 7). These blotchy areas on ripe fruit may occur in the most varied patterns, from perfect concentric circles to sharply defined islands of bright red on yellow, or *vice versa*. Fruit from affected plants is not always blotched, however, and blotchy towards also be harvested from plants whose leaves are apparently normal. It is a common misconception to believe, however, that in all cases where this particular  
 —————chiness does occur it is the virus of spotted wilt which is



**Cause.**—Spotted wilt is caused by a “virus,” or infectious sap which is carried from plant to plant both in the field and in glasshouses in South Australia by a very small insect, a special kind of thrips known as the “black carnation thrips” (scientific name, *Frankliniella insularis*) (Fig. 10). If a thrips has picked up the virus of the disease by feeding on a diseased plant, it may inoculate the disease into any healthy plant upon which it feeds subsequently. It can even inoculate a plant by feeding for only a few hours (possibly less than an hour, although this has not yet been

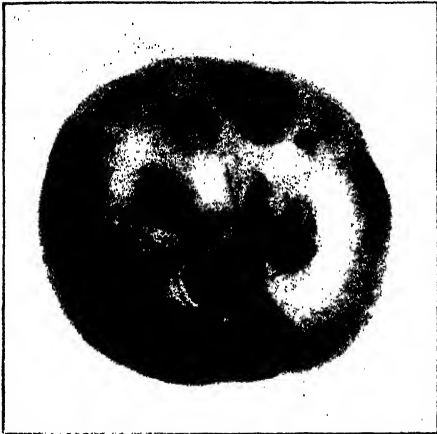


FIG. 6.—Bronze markings of spotted wilt on a green tomato fruit.

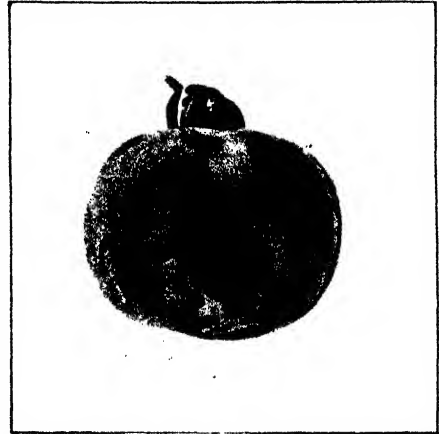


FIG. 7.—Irregular red and yellow blotches on a ripe tomato fruit from a spotted wilt diseased plant.



FIG. 8.—Diseased and healthy Early Dwarf Red seedlings, showing the very slight stunting, with bending downwards of the young leaves and folding together of the leaflets, which is often the only sign of spotted wilt in the earliest stages.

tested). It may then be disturbed perhaps and fly to a second plant, and so on for a life of several weeks. It is easy to see, therefore, how a very few insects in a glasshouse may cause very considerable loss, simply by moving from plant to plant and inoculating the virus of spotted wilt into each plant they feed on.



The virus of spotted wilt, when it is inoculated into a plant by the feeding of infective thrips, takes some 10 to 14 days to develop inside the plant before the top shows the bronzing and stunting symptoms. When diseased plants are noticed, therefore, it is scarcely ever possible to find the insect still on them which inoculated the disease into them. In this time it is almost certain to have moved on and inoculated several other plants. It is often possible, however, by careful examination, to detect the feeding-marks which the insect made. These are usually very inconspicuous, however, and consist only of one or more small sucked-out areas with a few black dots of excreta on them or near them (Fig. 9). They will probably be found on one of the older leaves, for the plant will have made some growth during the 14 days or so incubation period of the disease since the time of inoculation by the thrips.



FIG. 9.—Tomato leaflets showing the small sucked-out areas (a) with black spots of excreta on them, the feeding marks of the black carnation thrips, which spreads tomato spotted wilt. The disease is inoculated into the leaf by infective insects when they feed.

*Life-history of the Black Carnation Thrips, the Insect Carrier of the Spotted Wilt Virus.*—Since it is the black carnation thrips which is responsible for spreading the virus of spotted wilt, it is advisable to know as much as possible of the habits of this insect with a view to checking the thrips, if possible.

The thrips itself is a small, neat, black insect, about  $1/12$ th inch. long, which can move by quick hops or by short flights. It never becomes very abundant on tomatoes, and is usually very difficult to find, even when spotted wilt is spreading rapidly in the glasshouse.

The eggs are laid by the female in the leaf-tissue near where she feeds, being pushed just underneath the skin of the leaf. A female may lay from one to as many as eight eggs per day, the average number being three or four.



After some 10 days (more or less according to whether the temperature is low or high), the eggs hatch, and very small larvæ struggle free and begin to feed on the tissues of the leaf. At first they are scarcely visible, but gradually grow until they have the appearance of a very small yellow or orange-colored grub about half the size of a pin's head.

When full fed they go down to the soil for the pupa stage, in which they gradually change into a fully formed adult with wings (Fig. 10).

On emergence from the soil as adults they again seek plants to feed upon. If the plant on which they were hatched and spent their larval life was one infected with spotted wilt, the larvæ will have picked up the virus of the disease in feeding, and the adults will also be infective and capable of inoculating the disease into any further healthy plants they feed upon. The adults may live from one to several months. Females can lay eggs which will develop normally without having been fertilised by males.



FIG. 10.—A black carnation thrips (*Frankliniella insularis*), the insect which spread tomato spotted wilt. Magnified 50 times.

**Control.**—No way has yet been discovered of killing a virus after it has been inoculated into a plant, so that all efforts towards the control of spotted wilt at present must be directed to preventing the inoculation of the plants by infective thrips.

The first question which the glasshouse grower will ask is, "How do the thrips get in to the glasshouse? Where do they come from?" Unfortunately, the black carnation thrips, which carries the spotted wilt virus, is a very widely distributed thrips, and occurs in numerous garden flowers and weeds, especially in summer and autumn. There is no proof yet, however, that they do actually fly into glasshouses, though the occurrence of the first spotted wilt affected plants near the doors in many cases would seem to suggest that they sometimes do get in through the doors or broken panes at the ends.



In other cases, however, proof has been obtained that they are carried in from the seedbeds when the young seedlings are planted out, and this is probably the most frequent way of their gaining entrance. Not only may the adults be carried in, but also eggs still unhatched in the leaf, or larvæ feeding on the leaves, or even pupæ in the soil round the roots. It is, therefore advisable to keep a sharp look-out right from the commencement for traces of thrips feeding-marks on the seedlings in the seedbeds. Something can be done to check the insects, if they appear, by picking off leaflets with feeding-marks on them and spraying or dusting the plants thoroughly with nicotine. Probably, however, it would be more satisfactory to see that the seedbeds are kept free of weeds when they are empty, that weeds do not grow close round them at any time, to use specially prepared soil for the seedbeds as described on page 158 (September issue), to place the seedframes as far as possible from garden flowers, and to see that the sides and covers of the frames are reasonably tight. Cases have been recorded where new glasshouses or seedframes erected on new land have had more spotted wilt in them than old houses. The explanation is probably that the insect carrying the disease was present in the weeds on the virgin land.

Not all individuals of the black carnation thrips carry the virus of spotted wilt. They must first have picked up the virus of the disease by feeding on an infected tomato plant or an infected weed. Cases have been seen where thrips and their feeding-marks were present in a glasshouse and no spotted wilt was there. It is as well to be on the safe side, however, and make an effort to check thrips right from the early seedbed stage.

The next question to be considered is, "Can anything be done once infected thrips have gained entrance to a glasshouse and are already spreading the spotted wilt?" Very little success has been obtained in the few experiments carried out so far where spotted wilt had already infected a quarter or more of the plants when the experiments commenced. Matters, however, should never be allowed to develop so far, for at such a stage it is not only the quarter already showing the disease, but possibly a still larger number which have already been inoculated and which are still in the incubation period, which are actually infected. Leaving infected plants in also considerably increases the chances for the multiplication of infective thrips. If the recommendations on pages 161-2 (September issue) for the regular removal and burial of diseased plants at the end of every day are carried out this must necessarily considerably reduce the chances for multiplication of the disease. The difficulty is, however, that because of the long incubation period of the disease one can never "catch up," so to speak, and get rid of all actually infected plants at once.

The value of spraying or dusting as an aid in the control of the disease also requires further investigation. A comparatively few thrips, half the size of a pin's head, can cause losses running into hundreds of plants in a glasshouse. Spraying would have to be extremely thorough to get these few thrips, and eggs in the leaves and pupæ in the soil are out of reach of sprays. Since nicotine sprays are known to kill thrips, however, it is worth doing until further experimental work has devised a better method. At least two sprayings at an interval of 10 days should be given, using a nicotine-soap spray or a nicotine dust. If dust is used the temperature should be at least above 76°, and the warmer the better.



Summarising control methods for spotted wilt in glasshouses:—

- (1) Keep seedframes free from weeds during the time when they are not in use, and no weeds growing near them.
- (2) Use a special soil for seedframes which has not had weeds growing on it for a year.
- (3) Keep a careful watch on the seedlings in the seedbeds for signs of thrips feeding-marks. If noticed, pick off leaflets which have been fed upon and spray with nicotine-soap mixture.
- (4) Remove and bury infected plants from the glasshouses every day and spray twice with strong nicotine-soap spray at an interval of 10 days. Nicotine dust may be used if the temperature is 80° or more.

The control of spotted wilt in outdoor crops is at present still more difficult than glasshouse control. There is no direct method, such as spraying or dusting, which can be recommended as sufficient in itself. Tomatoes grown out in the country, well away from flower gardens, suffer much less from spotted wilt than those near the city, probably because the carrier thrips is not so abundant. Rotation of crops, so that tomatoes are not grown on land which has had tomatoes or potatoes the year before, is of value. Good cultivation of the soil before the tomatoes are planted and the keeping down of unnecessary weeds round the patch also assist. Particular attention should be given to getting out weeds of the same family as tomato, such as black nightshade. Finally, it is advisable to go through periodically (as frequently as possible) and pull out and destroy infected plants, especially in the young stages. These plants never do any good, and serve as centres from which infection can spread to healthy neighbors. The evidence at present available points to these indirect methods being of more value in control than direct spraying or dusting. Under certain conditions a nicotine-containing spray or dust may do some good.

#### STREAK DISEASE.

*Description.*—Streak disease (sometimes called stripe disease) may cause black stripes running up the stem of a plant, irregular black spots and lines on the younger leaves (Fig. 11), and sunken, discolored pits on the fruit (Fig. 12). In young plants it is usually only the markings on the leaves which are noticeable, though small, sunken streaks may also occur on the stem. At this stage it is sometimes very difficult to distinguish from spotted wilt. On older plants, however, the symptoms become more characteristic and easy to distinguish from spotted wilt. The stripes up the stem sometimes run for long distances and may be  $\frac{1}{2}$  in. or more in width, the tissue being sunken and grey-brown to black. The marks on the leaves are distinct from those of spotted wilt in that they are never a bronzing on the surface of the leaf in the early stages, but the tissue collapses right through and the marks can be seen on both sides of the leaf. They are also very definite and sharply marked spots or lines, and do not have the diffuseness so characteristic of spotted wilt. The color is also darker, being black in tint instead of the bronzing of spotted wilt. In many cases the leaf markings occur as irregular lines running more or less parallel to the midrib or main vein (Fig. 11), though leaves with



merely small, scattered, collapsed spots are also common. The fruit markings, sunken, irregular in shape, and discolored brownish are very characteristic.



FIG. 11.—Tomato streak disease on the leaves, showing the black sunken markings visible from both sides.

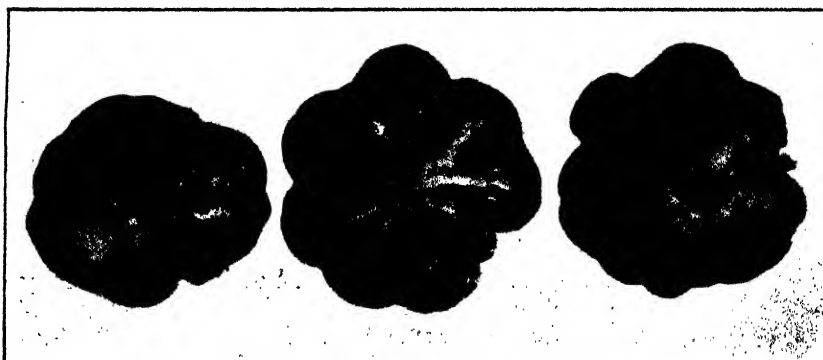


FIG. 12.—Tomato streak disease on the fruit, showing the characteristic brownish, sunken markings.

Very frequently infected plants are found to be several all together in a row, and the explanation of these cases is probably that the infection was carried on the fingers from one plant to the next during pruning.

*Cause.*—Streak disease is caused by a “virus” or infective sap, which may be carried from plant to plant directly on the fingers, or by green aphids. Like other virus diseases it has an incubation period of some 10 to 14 days, more or less, from the time of inoculation until the time when it is first visible as blackish spots and streaks on the younger leaves. During this time the amount of virus, which was probably extremely small when it was inoculated, has been multiplying within the plant until by the time symptoms show the whole plant is full of the infectious virus.



In North America streak disease is considered to be due to a mixture of two viruses (tomato mosaic and potato mosaic). The symptoms of streak disease in South Australia differ somewhat from those in North America, and so we cannot yet conclude that the same explanation of the cause holds here. We also have no information as yet on how the disease lasts over from season to season. It appears to be entirely a glasshouse disease here, and is not met with in the outdoor crops.

*Control.*—The most common way of spreading streak disease in glass-houses appears to be on the fingers of pruners. The small amount of sap which may get on the fingers from pruning a diseased plant (even though it may not yet be showing symptoms of the disease) seems to be sufficient to carry the disease on to the next healthy plant pruned. Here again the recommendations on pages 161-2 (September issue) for frequent inspection, marking, and removing of diseased plants *at the end of the day*, would probably assist greatly in the control of streak disease. In addition, the leaving of pruning for a fortnight if streak plants are seen is advisable, so that all infected plants have the opportunity to show up before pruning could spread the virus from plant to plant.

Aphis should also be kept under control with nicotine-soap spray or nicotine dust.

A curious feature of streak disease is that it is considerably influenced by the manurial treatment. Nitrogenous manures, and especially nitrate of soda, make it worse, whereas sulphate of potash tends to check it. The balanced manure suggested on page 163 (September issue) will tend to keep the disease in check, but if an outbreak does occur at a late stage when plants are too big to pull out, potash can be applied at a rate as heavy as 40lbs. per 100ft. of house, and will help considerably in firming up the fruit and reducing the amount of pitted fruit.

#### MOSAIC DISEASE.

*Description.*—Mosaic disease is not always easy to detect, and yet at times it may be extremely pronounced. It may show as an indefinite mottling of the leaves, in which light green and dark green areas occur together. Very often the leaves have a puckered appearance owing to the light green and dark green areas growing at different rates, so that the leaf cannot be spread out flat. Under glasshouse conditions there is usually considerable rolling inwards of the margins of the leaves (see Fig. 13). Also, under some conditions there may be very considerable distortion of the leaf-blades, which may occur to such an extent that some of the leaf-blades may not develop at all, there being only thin thread-like midveins, a stage which has been named "fern-leaf," or "stringy-leaf." The mottling due to mosaic should not be confused with that of the pallid leaves to be illustrated in Fig. 30. Mosaic mottling is a mottling of light green and dark green areas, and does not become whitish and pallid; it is nearly always accompanied by leaf-rolling, twisting, or distortion.

In its milder forms it is sometimes very difficult to detect whether a plant is infected with mosaic or not, although if the young plants are growing vigorously there is usually not much difficulty. In the later stages of growth the effect may vary from a very small to quite a considerable reduction in yield of fruit, due mainly to non-setting of the blossoms. What fruit there is, however, is usually normal in appearance.



*Cause.*—Mosaic is due to another “virus,” or infective sap. It is extremely infectious, and the small amount which adheres to the fingers or pruning knife after pruning a diseased plant may be quite sufficient to inoculate several healthy plants pruned subsequently. In some cases, in fact, merely brushing against a diseased plant and then brushing against a healthy one may be sufficient to inoculate the latter. Once again, although an exceedingly small amount of virus is sufficient to transmit the disease, it soon multiplies in an infected plant, which in a few days becomes full of virus in every part.

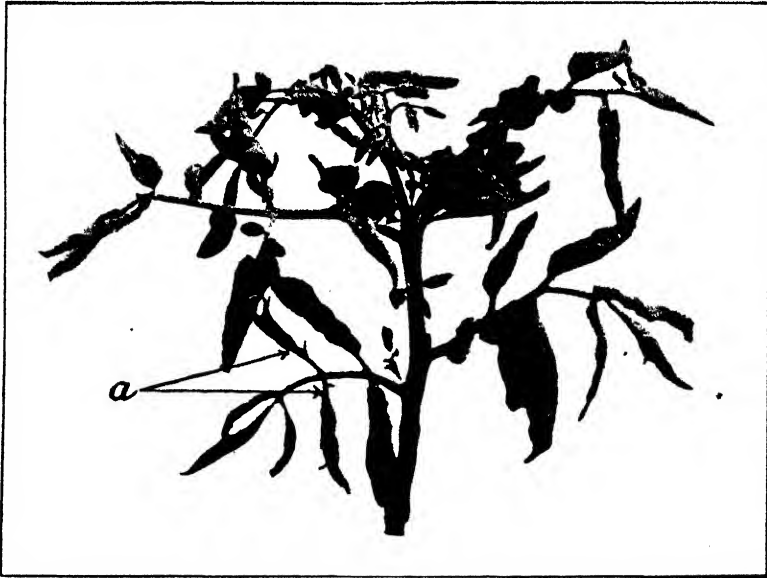


FIG. 13.—Mosaic disease on a young glasshouse plant, showing the rolling round of the leaflets, with tendency towards thready leaflets shown at (a).

Aphis, after sucking a diseased plant, can also transmit the disease subsequently to any healthy plants on which they feed.

*Control.*—The routine of inspection, marking, and removal of diseased plants at the end of every day or two, as previously recommended, will be of great assistance in preventing the spread of mosaic disease. If several cases appear it would be advisable to prune only once a fortnight, so as to avoid spreading the virus from plants which are still in the incubation period. It would also be safer to mark doubtful plants and prune them at the end of the day.

All plants removed should be buried or burnt, for the virus of mosaic disease is very long lived, and may last in well-rotted compost heaps for several years. It is not always easy to say where the first infection every season comes from. The keeping of seedbeds free from weeds while they are not in use will most probably aid in reducing the chance of these first infections. Aphis should be controlled by nicotine sprays or dusts.

[To be continued.]



# THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

## FORTY-FIRST ANNUAL CONGRESS.

In the presence of a record attendance of delegates and visitors the Forty-first Annual Congress of the Agricultural Bureau of South Australia was opened in the Way Hall on Monday, September 15th, 1930, at 8 p.m., by His Excellency the Governor, Brigadier-General the Hon. Sir Alexander Hore-Ruthven, V.C., K.C.M.G., C.B., D.S.O.

Officers present at the opening ceremony included the Hon. S. R. Whitford, M.L.C. (Minister of Agriculture); Messrs. F. Coleman (Chairman); H. N. Wicks (Vice-Chairman); A. M. Dawkins; Geo. Jeffrey; J. W. Sandford; R. H. Martin; A. J. Cooke; S. Shepherd; A. L. McEwin; P. H. Jones; Professor A. J. Perkins (Director of Agriculture); W. R. Birks (Principal, Roseworthy Agricultural College); members, Advisory Board of Agriculture; Messrs. W. J. Spafford (Deputy Director of Agriculture); Geo. Quinn (Chief Horticultural Instructor); C. F. Anderson (Acting Poultry Expert); W. J. Adey (Director of Education); Professor J. Prescott and Dr. J. Davidson (Waite Research Institute); other officers of the Department of Agriculture; H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary, Agricultural Bureau).

The following delegates attended:—Alawoona—W. Paull; Allandale East—W. M. Laslett; Alma—A. B. Smyth, A. H. Shepherd; Angaston—Wm. Sibley, Wm. Patching; Arthurton—H. D. Noble, L. Gordon; Auburn Women's—Miss L. Dennison, Mrs. J. F. Schmerl; Ballhannah—C. Grasby, H. Rollbusch; Balaklava—H. B. Schaefer, H. Masters; Bectaloo Valley—H. K. Paul, T. Jones; Belalie North—W. Cummings (jun.); Belalie Women's—Mrs. Alee Mitchell, Mrs. E. L. Orchard; Berri—A. G. Jarvis, A. V. Mills; Blackheath—H. Paech; Black Springs—C. Dunn, A. Heinrich; Blackwood—F. B. James, H. Goldsack; Block E—M. Pethück, A. R. Nenke; Blyth—W. O. Elme, H. E. Zwecke; Booleroo Centre—S. McMahon; Boolgun—W. A. Ellis, R. Castle; Borrika—E. H. Huxtable, V. V. Brown; Bowhill—A. S. Just, A. P. Spry; Brinkley—E. G. Humphrey, C. H. Pearson; Brinkworth—G. E. Ottens, H. Snow; Brownlow—G. H. Rooke, F. Woihe; Buchanan—L. V. Bell; Bute—E. Ebsary; Bugle—H. Ballman, E. T. Smith; Butler—D. B. Butler; Calca—Pat. Murphy, Ed. Roberts; Caliph—G. H. Trevilyan, W. H. Todd; Caltowie—J. E. Lehmann, R. W. Wilkinson; Caradue—E. T. Marshall; Chandada—R. Loveday, C. Whenton; Cherry Gardens—C. G. Terrell, I. N. Stone; Clanfield—H. L. Billing; Clare—J. Seales, H. F. Hicks; Clarendon—L. C. Spencer, T. B. Brooks; Coomandook—F. E. Ballard, W. R. Trestrail; Coonawarra—Wm. Snelling; Copeville—J. N. Collins, G. H. Sutherland; Cungenah—H. R. Patterson, W. H. White; Dudley—A. G. Telfer; Elbow Hill—W. T. Cooper, S. V. Wake; Eudunda—H. D. Michael; Eureka—J. Polden; Eureka Women's—Miss F. Kaerger, Miss C. Brown; Everard East—F. C. Hughes, E. G. Colton; Gladstone—J. H. Sargent, G. M. Black; Gladstone Women's—Mrs. F. C. Spottswood, Miss J. Sargent; Geranium—E. J. Williams, L. S. Prouse; Goode—A. A. Howlett, Fred. Handke; Goode Women's—Miss C. M. Paech, Miss D. M. Fagan; Green Patch—C. J. Whillas, E. Chapman; Hanson—W. J. Woollacott, H. J. Turner; Hartley—John Brook; Hayleton—W. J. Chapman, P. J. Saunders; Inman Valley—R. J. Gregory; Jamestown—W. G. R. Bradtke, C. L. Hewett; Kalangadoo Women's—Mrs. G. Ellison, Miss A. Kennedy; Kanni—F. A. Hoad, F. W. Woodhead; Kalyan—V. A. Luhrs; Kangarilla—D. A. Bottrill; Kangarilla Women's—Mrs. J. White, Mrs. G. Thorpe; Keith—A. M. Densley, A. W. Shannon; Kelly—E. H. Eatts, Wm. Wornum; Ki Ki—O. Blucher, W. Goodall; Koolunga—F. J. Pedler; Koonibba—E. E. Lutz; Koonunga—B. J. Mickan; Koppio—M. Gardner; Kringin—H. Dunn, E. Werner; Kulkawirra—J. Kelly, C. H. Robin; Kybybolite—D. Quinn, C. Castine; Lameroo—Colin Wendt, R. J. Koch; Langhorne's Creek—R. L. Borrett; Laura—E. Peck; Laura Bay—W. L. Edson, A. B. Lowe; Light's Pass—A. J. Chapman, T. W. Roenfeldt; Lone Pine—E. R. Hentschke,



H. Milde; Loxton—M. Shannon; Lyndoch—J. S. Hammat, E. C. Filsell; Mallala—E. G. W. Earl; Maltee—L. M. Martin, N. J. O. Sporne; Mangalo—F. Coles; Marama—A. Rogers, T. Hinkley; McGillivray—D. G. Smith, T. C. Humphries; McLaren Flat—Geo. Dowdell, Wm. Mobsby; Meribah—L. N. Galley, E. H. Carr; Millicent—E. J. Mitchell, H. J. Hutchesson; Millicent Women's—Mrs. W. H. Altschwager, Mrs. W. Varcoe; Miltalie—G. J. Payne, J. P. Story; Mindarie—J. E. McCabe; Modbury—D. Sheenan, A. Pitman; Monarto South—H. A. Hein, M. Kuchel; Moonta—N. C. McCauley; Mount Barker—L. Frame, H. Hunt; Mount Bryan—J. R. Simpson, W. H. Quinn; Mount Compass—B. Proctor, A. Kidman; Mount Gambier—E. W. Tollner, G. T. Gurry; Mount Hope—J. H. Vigar; Mount Pleasant—W. T. Vigar; Mudamuckla—R. Clement, V. V. Brandon; Mundalla—L. M. Dinning, A. Ross; Murray Bridge—S. S. Jones, A. Wells; Murraytown—E. B. Pitman, Fred. Borgas; Mypolonga—L. R. Haynes; Nantawarra—E. V. Hamdorf, K. W. Young; Narridy—H. K. Lock; Narrung—J. W. McNicol, D. Bakewell; Nelshaby Women's—Mrs. S. M. Jose, Miss A. E. Lawrie; Nelshaby—H. Franks, E. Williams; Netherton—F. H. Jessop, C. M. Wilkin; Nunkeri—H. S. Sanders; Orroroo—N. S. Lillierappe, A. I. McCallum; Owen—M. Freebairn; Palabie—C. A. Rushleigh, E. H. Rashleigh; Parilla—J. H. Seidil; Parilla Well—W. H. Simpson, N. E. Venning; Parilla Well Women's—Miss D. Fergusson, Miss S. Burford; Parrakie—W. J. B. Halliday; Paruna—F. A. Hondow, A. A. Petch; Paskeville—W. B. Cox, J. Prouse; Penola—H. B. H. Richardson, F. W. Hinze; Penwortham—A. T. Duke, H. Richardson; Petersville—F. Duke; Pinnaroo—A. T. Hawthorne, H. W. Davis; Pinnaroo Women's—Mrs. W. B. Davis, Mrs. C. R. Mattiske; Pinbong—H. B. Scholz; Pinkawillinie—S. C. Johnson; Port Elliot—F. C. Keen, J. P. Colebatch; Pygery—Wm. Duggin, F. H. Heath; Quorn—O. Noll, L. Eckert; Rapid Bay—G. V. Roper; Redhill—H. J. Crouch, J. V. Durden; Rendelsham—S. S. Smith, F. R. White; Riverton—O. E. Longbottom; Rudall—H. Palmer, R. Crabb; Saddleworth Women's—Miss E. D. Patridge, Miss H. D. Coleman; Sandalwood—J. E. Hood, A. Grant; Scott's Bottom—F. Butler, E. L. Atkinson; Smoky Bay—H. Denton; Snowtown—A. E. Dolling, N. B. McDonald; Spalding—S. Trengrove; Strathalbyn—J. R. Rankine, H. A. Eckert; Streaky Bay—A. T. Barns, A. E. Cotton; Talia—J. McBeath, Wm. Cameron; Taplan—W. J. Hammon, P. R. Hodge; Taragoro—Ted. Winters, C. Hoffrichter; Tarlee—H. Battley; Tatiara—H. G. Fisher, L. H. Butler; Thrington—H. K. Queale, H. Rodda; Tulkineara—F. H. Vurdon; Truro—L. F. Denholm; Tweedvale—W. E. Wudtke; Virginia—T. O'Loughlin, W. S. King; Waikerie—L. B. Pope; Wallala—H. V. Brown, D. Coxon; Wandearah—W. C. Slater, J. S. O'Shaughnessy; Warrambo—F. Chilman; Wasleys—F. P. Diment, C. R. Currie; Wasleys Women's—Mrs. Day, Mrs. Wilson; Watervale—G. Holder; Weavers—N. G. Agnew, H. W. Cornish; Wepowie—Ed. C. Rooke, Dean Gregurke; Wauralte—A. Mitchell; Wilkawatt Women's—Mrs. H. L. Billing, Mrs. H. Pritchard; Williamstown Women's—Mrs. G. Hammat, Mrs. E. Rowe; Willowie—W. B. Bull, J. L. Schmidt; Wilmington—J. F. A. Zimmermann, N. Christopherson; Windsor—R. C. Ford; Wirrabara—A. B. Curtis, Jos. Hollitt; Wirrilla—A. Sandow, J. Ross; Wirrilla Women's—Mrs. R. Woods; Wolseley—H. C. M. Pilgrim, E. W. Sharrad; Wudinna—Chas. Newbon, W. P. Hartley; Yandarie—H. W. Zinkler; Yallunda—A. Cabot, R. P. Cabot; Yandiah—W. Keller; Yantanabie—J. B. Karutz; Yeelanna—W. J. Johnson; Yorketown—C. B. Stead; Yurgo—H. Kelley; Kynacutta—F. E. B. Daniels, J. A. O'Loughlin; Parilla Women's—Mrs. C. Phillis, Mrs. Welden.

#### OPENING CEREMONY.

In the course of the opening address, His Excellency said he supposed there had never been a time in the history of the country when the importance of bringing the aid of science to agriculture had been greater. The one subject occupying their minds was how to reduce the cost of production, especially in the export industries. One certain method was by reducing the cost of the production of wheat, wool, and meat by eliminating the pests that destroyed and hampered the growth of those valuable commodities. They were all anxious to improve and increase trade within the British Empire, and that could



only be effected if they could compete in British markets with other countries. It was staggering to find that one-tenth of what the country received for its wool last year went to balance the loss inflicted by blowfly and footrot. Such figures revealed how large a margin might be saved, and how immediately closely connected was the work of scientific research in the cause of Empire development. Australia might well be the stock farm of the Empire, supplying cheap meat to all those parts less well situated.

#### DISSEMINATION OF KNOWLEDGE.

Not only was the lowering of production costs a question of overcoming pests and diseases; there was also a huge field of positive health work in agriculture, in breeding better animals for fleece, hide, or meat; introducing new fodder plants, improving cultivation of grain and fruit, and basing settlement schemes on fuller knowledge of the properties of the soil. But in order to get the best results co-operation between the scientist in the laboratory and the man on the land was essential. Although he had found among farmers and agriculturists a considerable amount of interest, he regretted that occasionally he found a good deal of ignorance as to what the scientists were doing. The great task now was to disseminate the knowledge gained. Co-operation was also needed between the different institutions and scientists throughout the Empire, so that no time and money should be spent in covering ground for which results were already in existence elsewhere.

At the instance of Mr. G. Jeffrey, seconded by Mr. R. H. Martin, a hearty vote of thanks was accorded His Excellency for opening the Congress.

#### THE MINISTER'S ADDRESS.

Addressing the Congress, the Hon. S. R. Whitford, M.L.C. (Minister of Agriculture) said:—"It is with pleasure that I find myself called upon to-night to address this great body of organised primary producers. I am, as you are no doubt aware, comparatively new to office, and fear that my Parliamentary and administrative duties have not hitherto allowed me to come into as close contact with you as I could have wished. I am persuaded that you will find me to improve upon closer acquaintance, and I trust that, in due course, time will remedy this apparent shortcoming of mine. I am reminded, however, that in the eyes of some this may not be my only shortcoming; it may be objected that I am Minister of Agriculture without any personal knowledge of agricultural operations. But, just because I am unfortunate enough not to have been a farmer of sorts, you must not imagine for a moment that my interest in rural production is lukewarm. Indeed, I shall go as far as to say that here in South Australia nobody is adequately fitted to hold a prominent position in public life who is not intensely conscious of the importance of rural production both to himself as an individual and to the State as a whole. Moreover, am I not surrounded by a competent technical staff, upon whose advice I can always depend when trouble looms ahead? As for myself, what I lack in knowledge and experience in these matters, I promise to make good in helpful sympathy with all those who in these difficult times are carrying the burden of rural production; nor, I trust, shall I be appealed to in vain by those to whom I can be of any Ministerial assistance.

But, on consideration, I think that layman though I be in matters agricultural, I can claim two points of contact with you, which should assist towards our mutual understanding. I have been a miner, and therefore a primary producer; and whilst your days might be said to be usefully occupied in tickling the surface of the earth, mine, in earlier times, took me into its bowels in quest of a livelihood. I entertain no doubts as to which of these occupations is the pleasanter of the two; but whilst I might be in two minds as to which is the more honorable, I am personally convinced—and I am sure that you will agree with me—that there is no other occupation more honorable or more useful to mankind than either of these two..



My second point of contact lies in the fact that, whilst I can look upon you collectively as an organisation for that type of mutual assistance that comes from the free exchange of experience and ideas, I, on my part, have been an organiser of industrial bodies for mutual help and economic defence. These facts, I take it, will help me to visualise your efforts and your troubles with the sympathy of complete understanding. It is often said of rural producers that relative isolation, coupled with incessant struggle against intangible forces, tend to make them unrepented individualists, whom a superhuman smith alone could weld into mutually helpful association. Your corporate existence of over 42 years would seem to give the lie to any such suggestion; but perhaps I should attribute your success in this direction to the rigid exclusion of political and religious topics from the ambit of your activities. I am told that you have 300 Branches distributed over the length and breadth of the State, aggregating 8,200 members, and I realise very fully that your claim to speak on behalf of the rural community as a whole is based upon quite adequate competency. I am particularly pleased to learn that the ladies have not been overlooked, and that you have 18 women's Branches, eight of which have been opened in the present year. In no other occupation is woman to a greater extent the active working partner of man than in rural industries, and in no other, I fear, has she, as a rule, less opportunity for personal development and relaxation. Hence, I trust that these women's Branches will do much towards raising the status and improving the outlook of country womenfolk. The only fault I have to find is that 18 Branches out of a total of 300 seems to me an altogether disproportionate number. There should, in my opinion, be as many women's Branches as there are men's.

I may be expected to say something about the agricultural policy of the Government to which I have the honor to belong. I shall remind you, however, that we are going through troublous times of world-wide incidence, and that since our assumption of office the financial outlook has unavoidably and inevitably overshadowed every other issue. Nevertheless, I do not wish to imply that this Government, any more than any other Government worthy of the name, can afford to overlook the national claims of rural production; indeed, had there been any need, the financial crisis through which we are passing would have sufficed to make the position clear. Our debts—incurred very largely apart from war commitments in the development of a new country—can be met from one source only, namely, the primary products of the country. The present Government is well aware of this position and to the limit of its means is anxious to foster rural production in the general interests of the State. Many of you, I know, have been putting up a gallant fight against adverse seasons and falling market prices, and I can realise how much at times your patience must have been tried by these insistent demands for greater and greater production. Unfortunately, as a community, we find ourselves to-day in an exceedingly difficult position, partly, it must be owned, of our own creation; and, whilst we need entertain no doubts as to eventual extrication, there appear, humanly speaking, to be two things only that can open the way to an early return of normal conditions, namely (1) strictest economy in both personal and national affairs, and (2) highest possible returns from primary production. In the circumstances, therefore, whilst realising that the value of returns is dependent partly upon market prices, I feel that I, too, must add my voice to those of others who have already asked you, on behalf of the State, to aim persistently at maximum production from your holdings, particularly in the matter of products enjoying a ready demand on the markets of the world, such as wheat, wool, fat lambs, eggs, and dairy produce generally. On the part of all, a policy of this kind will imply intensified effort, on the part of some possibly unrewarded sacrifices, but to the majority, I am satisfied, it will bring consolidation of interests and ultimate prosperity. But, in these days, I feel sure you will rise above mere personal considerations and feel nothing but pride in the fact that you—a relatively small section of the community—hold in your hands the key which is to open the door to the return of better days for the State which has entrusted to you the management of its lands.



Whilst on the subject of exports, let me remind you that if in the past one factor within our control more than any other has detracted from their net value, both to the exporters concerned and to the State as a whole, it has been unevenness in quality, coupled with slovenly get-up and faulty grading. This is a very serious matter to all concerned, and I trust that when you aim at maximum production you will also, if only in your own interests, aim at optimum quality that your circumstances permit of. The world does not want addled eggs or butter made from inferior cream, nor does it buy chaff and rubbish when purchasing wheat; it follows the simple expedient of paying less for the article than it would otherwise have done. Let me remind you, too, that on any market the inferior article sets the standard of price, much to the detriment of the interests of the State. There is no reason why New Zealand butter and lambs should command higher prices on the markets of the world than our own, apart from the piebald character of many of our consignments.

How such a policy of expansion can be developed to best advantage I lack perhaps the competence to say, and, having indicated its necessity, I must leave the difficulties and practical details to yourselves and my officers, whose efforts in this direction will at all times have the support of Government. It is true that I have been told that wheat at 3s. 6d. a bushel will not pay costs of production on a 6½bush. harvest such as was garnered in last season, but with the return of good seasons, which we all anticipate, would this be true of a normal 12bush. harvest? And with the general extension of improved farming methods, may we not hope that the day is not far distant when again, like in 1916, we shall reap a 16½bush. harvest.

I have already admitted lack of experience in matters agricultural. I therefore crave your indulgence for anything that might be amiss in a little flight of fancy of mine as to the position of the farmer. In these days I conceive of him as occupying a relatively privileged position, as one upon whom has fallen the duty of rescuing more or less helpless fellow citizens. I conceive of him as very largely master of his own

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destiny, secure in his home tenure, master of land, which is both workshop and larder, begetting his own working staff, whose family is not called upon to scour the highways and byways in quest of that illusive will-o'-the-wisp—work.

I conceive of the farmer as director of an important national concern, whose duty it is to so arrange matters that the land he occupies provides regular daily work for himself and his staff. And in such circumstances I cannot imagine him excluding everything from his holding except wheat; although I admit that human nature being what it is, the glamor of 5s. or 6s. for wheat in the field would probably drown the voice of conscience in this respect. But to-day wheat is nearer 3s. than 5s., and in the national interest must still be grown by those to whom the land has been entrusted, and when, unfortunately, individuals fail here and there, there are always others ready to step into the breach and continue the good fight. When the market value of the main crop is low, I can imagine the farmer, consciously or subconsciously, determining that his land shall do more than carry wheat, that he and his staff shall make more intensive use of the daylight hours, that not wheat only, but wool, lambs, cream, pigs, eggs, &c., shall be taken to market, and so maintain at a maximum level the gross returns of his farm.

I trust that my conception of the farmer may not be considered too fanciful. I suggest that what I have in mind is already being practised by many, and hope that those that lag in the rear will join hands with the front ranks and help to hasten on the day when the workless of the community will no longer have to beg for work in vain.

I have already referred to the present essentialness of economy in both personal and national affairs. In this connection the Government of the day has already set its hand to the plough, and there will be no looking back, and private individuals in their own concerns cannot hope to do otherwise. In those delusive years that followed the war we have, both individually and nationally, indulged in an orgy of extravagance; there have been too many motor cars, too many tractors, too much foreign petrol used, too many picture shows, wireless sets, silk clothing &c.; in fact, too much mortgaging of the future; and the net result is now obvious to the most near-sighted among us. Let us strive to return to the simpler ways of the past, and all will eventually be well with us." Mr. S. Shepherd moved, and Mr. A. L. McEwin seconded, a vote of thanks to Hon. S. R. Whitford, M.L.C.

#### CHAIRMAN'S ADDRESS.

Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) said:—

The hearty applause with which you expressed your appreciation just now of His Excellency's address meant something more than thanks for his presence at the opening of the Forty-first Congress of the Agricultural Bureau. Might it not also be taken as a recognition by this gathering of primary producers of the State of the real, practical interest and encouragement His Excellency and Lady Hore-Ruthven have shown at all times in the development of South Australia and the welfare of the people generally? His phrase, "Hats off to the past, coats off to the future," has behind it a strong incentive to bear our burdens as the pioneers bore them, and by hard work to do our share, each and everyone, to help our State in this time of need.

We welcome among us the presence of the Hon. Minister of Agriculture, and assure him that the vote of thanks just accorded him was no formal one, but an appreciation on behalf of the primary producers of the honest efforts being made by the Government to meet our financial liabilities and put our house in order.

The only change in the personnel of the Advisory Board has been the resignation of Mr. Mayfield, of Booborowie (on account of ill health), and the appointment of Mr. A. L. McEwin, a practical and successful farmer of Blyth, to fill the vacancy caused by the resignation of Mr. W. S. Kelly in the previous year.



I think it may be taken for granted that there is need for more agricultural co-operation among us, and especially among the smaller producers, many of whom are often poor because of backward methods, and backward in their methods because they are poor. Surely the purpose of the Agricultural Bureau is based on the co-operative lines of mutual help and assistance, on the dissemination of knowledge, and the intelligent application of that knowledge among the agricultural and producing population of the State; the more the Agricultural Bureau functions up to that ideal, the more it endeavors to make the tillers of the soil more efficient members of the community, so will it be worthy of the practical support of every citizen of the State.

We have 300 Branches, an advance of 25 since last Congress, a membership roll of 8,200, and Branches are, as a whole, active and useful, the increase in the number of young men is a most promising sign.

In the first year of the Bureau's existence there were 18 Branches, with a membership of 100. In the course of 20 years the roll increased to 113 Branches, with a membership of 2,000. Twenty years later (1929) the roll further increased to 275 Branches, with a membership of 7,600. A very satisfactory feature of the progress is seen in the membership roll of the past few years. In 1929 net increases to the membership totalled exactly 1,000. At no time during the existence of the Institution has this increase been equalled, and it therefore constitutes a record. During the year just concluded no fewer than 590 members have been added to the previous year's membership, and prior to the record year of 1929 this has only been equalled in one year, namely, 1914. We are indeed very proud of these figures, but I venture to say that there are many districts in this State where Bureaux should be established, and I feel sure that, with the influence of our esteemed Departmental Instructors, we will eventually see Branches studded on the map wherever agricultural pursuits of any kind are practised.

Here I want to say a word of acknowledgment on behalf of the Board and of this Institution as a whole, of the valuable services to the Primary Producers of this State rendered by the Department of Agriculture, so well equipped and organised under the direction of Professor Perkins and his efficient staff.

#### WOMEN'S BRANCHES.

The good attendance at the fourteen Conferences held during the past year has been very encouraging. The attendance of the ladies at these Conferences has now become quite a recognised feature, and sessions in which they have read and discussed papers of special interest have added to the value of these Conferences. There are now 19 Women's Branches, with a membership of 500. These meetings of our Country Women are appreciated by the members, for there are so many matters connected with domestic life, health, sanitation, the garden, and the home generally that will appeal to our women folk.

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I would like to publicly acknowledge the assistance which the Director of Education has given us in the work of the Women's Branches. The lectures and demonstrations already given by Miss Campbell have been highly appreciated, and we look forward to a continuance of these lectures, which I can assure the Director will in future be regarded as an important factor in the education of country women. We are indebted to the Director also for the inclusion of Miss Campbell on the Congress Agenda, as well as for his assistance in securing the services of Miss Allen.

#### LIFE MEMBERSHIP OF THE BUREAU.

Life membership certificates have been issued to the following:—Geo. H. Bammann, Roseworthy; W. T. Vigar, Mount Pleasant; A. D. Adamson, Penola; S. Ockley, Penola; A. Fisher, Tatiara; J. B. E. Wake, Kelly; T. Longbottom, Riverton; R. J. James, Riverton; J. B. Kelly, Riverton; A. Langeludecke, Naracoorte; F. Nottage, Meadows; H. G. Kupke, Morchard; B. S. McCallum, Morchard; C. F. Jericho, Butler; D. B. Butler, Butler; A. Bradley, Kybybolite; E. H. Hall, Eureka; W. J. Oldland, Mount Remarkable; H. W. Lawes, Lyndoch; P. D. Burge, Lyndoch; B. F. Hillier, Gawler River; J. H. Bussenschutt, Paskeville; E. Moss, Salisbury; W. J. McNicol, Salisbury; C. G. Borgas, Appila-Yarrowie; J. Sinclair, Green Patch; H. Thompson, Koppio; T. H. Howlett, Artherton; W. N. Seeker, Lucindale; H. E. Harper, Clarendon; L. C. Spencer, Clarendon; E. A. Harper, Clarendon; J. R. Nicolle, Clarendon; W. R. Lewis, Berri; T. F. Orrock, Wepowie; C. H. W. Knauerhase, Wepowie; J. S. Hammat, Lyndoch; R. J. Rose, Laura; S. V. Wake, Elbow Hill.

The Board has considered the appointment of life membership. In the past, a record of 20 years' service as a member of the Bureau has been recognised as qualification for life membership, but as the Bureau gets older and an increasing number of our younger members join, we may soon find that life membership is no longer much more than simply a recognition of 20 years' connection with the Bureau. It has been suggested that these certificates should be granted for distinguished service apart altogether from the fact that the holder may or may not have been a member of the Bureau extending over a period of at least 20 years. In this way the certificates of life membership would apply to those who have served the community through the Agricultural Bureau in a manner deserving of special recognition and for more than simply a membership of 20 years, creditable as that alone is.

#### PRIMARY PRODUCTION.

With regard to our primary products. First, the market for our wool, which a year ago was giving very grave concern, has apparently reached a level not too low to be remunerative. May not pasture improvement (in which the Waite Research Institute is doing such good work), the growing of catch crops on stubbles, and the topdressing of our grass lands, help us to grow more wool per sheep per acre within the agricultural areas in which quite a substantial percentage of our wool, even our Merino wool is grown.

The wheat crop promises well; if Sir Otto Niemeyer is right in saying we cannot look for improving wheat prices, then the only alternative is to increase our production per acre, and I feel sure this can be done by raising the present district average yield to somewhere near that reached by the farmers in each district who get better yields than their neighbors, in short, by speeding up to the standard set by those who year after year raise the heavier crops of grain per acre, and thus not only increase the State's aggregate yield, but reduce the cost per bushel at the same time.

Dairying claims the greater attention, here "many mickles make a muckle." In 1929 we imported into South Australia 1,697 tons of butter, and during the six months ended June 30th last 1,370 tons, these, at £175 per ton, came in 1929 to £296,983 15s., and in 1930 to June 30th £239,820. In round figures nearly £300,000 last year and £240,000 to June 30th this year. Figures which, I venture to say, are no credit, nay,



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I make two blades to grow where one grew before, providing feed and food where hunger would prevail. I make possible profit where otherwise loss would accrue. And, while I serve, I leave with the soil a portion of myself which forms a residual asset for years to come.

Plants, like all other forms of life, must feed. It is my function to furnish food for plant life.

I am a service. All I need is an opportunity to show what I can do. Experiment stations throughout the land have given me this opportunity—have tried me out and found my ability not wanting. Farmers everywhere testify to my power.

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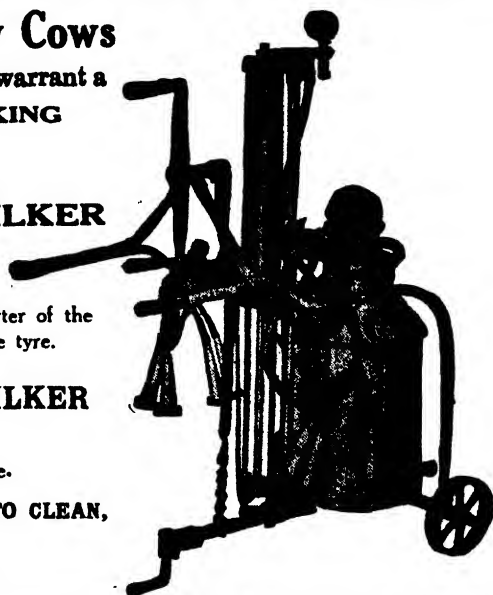
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are a disgrace to South Australian men on the land. Cannot we do something to stop this drain of over a quarter of a million of money going out of this State to buy our butter? At Eudunda, with 17½ in. rainfall, and without natural advantages beyond dozens of other places in the Lower North among the Barossa and Mount Lofty Hills, some farmers are not only producing butter far beyond their own requirements, but are actually making a living from their cows alone.

Our fruit growers claim our sympathy, our apple growers in particular have had a very disheartening time; just how we are going to help them I hardly know. It has been said that if everyone ate an apple a day we could find a local market for all we produce, but I fear the transportation and handling charges would make the cost too heavy per family in many cases. Fruit juice drinks are helping our orange growers, and surely we could consume far more dried fruits than we do.

Our minor farm products, calves, lambs, pigs, bacon, poultry, eggs, and honey will all, when produced on the farm, help to keep down the household expenses, and often bring in that ready cash so welcome to us all.

#### WOMEN'S BRANCHES.

On Tuesday, September 16th, at 9.30 a.m., Mr. H. C. Pritchard (General Secretary, Advisory Board of Agriculture) opened the sessions of the Women's Branches of the Agricultural Bureau of South Australia, when Mrs. Hammat (Williamstown Branch) was appointed President, and Mrs. Orchard (Belalie Branch) Secretary.

Mrs. H. L. Billing (Wilkawatt) then read a paper, "The Commonsense Kitchen, the Centre of the Home," which was followed by a short paper on "Floor Polishing," by Mrs. Messenger (Kalangadoo).

Short addresses were delivered by Messrs. Geo. Jeffery and A. M. Dawkins. (members of the Advisory Board of Agriculture).

Mrs. Vaughan spoke for a few minutes, and asked for the country women's help in finding positions for children leaving High School.

Miss Lois Allen, B.A., delivered a most interesting and instructive address, "The Differences in Temperament and Ability in Children."

The President of the Metropolitan Branch of the Country Women's Association offered the use of the Country Women's Association rest room at Cravens, Rundle Street, to the delegates during Show week, and spoke on the work in Adelaide of the Country Women's Association.

The Tuesday afternoon session opened at 2.15 with a paper, "Home Nursing," by Mrs. W. Varcoe (Millicent).

Mr. Pritchard answered several questions *re* visits from officers of the Education Department.

Mrs. C. H. Phillis (Parilla Well) then read a paper, "Preparation and Curing of Bacon." On a question from Gladstone Branch several delegates gave suggestions for Annual Meetings, and the work of Branches was discussed. Delegates then visited the South Australian Farmers' Co-operative Union butter factory and egg-packing plant at Mile End.

At the opening of the Wednesday morning session Mrs. Wilson (Wasleys) moved a resolution:—"That the President and Secretary of the 1930 Congress confer with the General Secretary *re* the agenda for 1931 Congress." Seconded by Mrs. Rowe (Williamstown) and carried."

Miss Ellie Campbell, Dip. Dom. Econ., gave an address on "Diets in the Home."

A hearty vote of thanks was accorded the President and Secretary at the conclusion of the morning session, and Mrs. Hammat responded on behalf of herself and Mrs. Orchard. Forty-seven delegates then inspected Messrs. Ellis Bros.' bakeries, Gouger Street.

*The papers read will be published in a subsequent issue of the Journal.*

(To be continued.)



## THE OCCURRENCE OF THE RED LEGGED EARTH MITE (*Penthaleus destructor*, JACK) IN SOUTH AUSTRALIA.

[WORSLEY C. JOHNSON, R.D.A. (Hon.).]

In the Council for Scientific and Industrial Research, *Quarterly Journals*, Vol II., December, 1929, p. 244, and Vol. III., August, 1930, p. 189, there appear paragraphs issuing warnings as to the potential danger of the spread to the Eastern States of this mite (*Penthaleus destructor*, Jack).

The mite is well known in Western Australia, where it is regarded as one of the most serious entomological pests with which the agriculturalist has to deal. It is believed that the pest was introduced from South Africa, and was first reported from Bunbury, in 1917, when it was investigated by Mr. L. J. Newman, Entomologist of the Department of Agriculture. In the vicinity from which it was first reported in Australia it is believed to have been introduced amongst some soil which had been used as ship's ballast, and was taken for reclamation work along the foreshore. While the means by which the pest was introduced will never be definitely known, there is a certain amount of justification for the foregoing theory, particularly when it is realised that Bunbury had a large trade with South Africa in jarrah sleepers, and very little back loading, which necessitated boats returning in ballast. It is also significant that the pest is well known in the southern provinces of the Union under the name of Black Sand Mite.

The writer's attention was drawn to a pest by Mr. W. S. Kelly, of Giles Corner, and the similarity of this mite to the Western Australian pest caused him to have specimens forwarded to Victoria and Western Australia for identification.

Mr. L. J. Newman, in a letter to the writer, expressed the opinion that the specimens were identical with the western pest, and designated them as *Penthaleus destructor*, while Mr. C. French, jun., Entomologist of the Victorian Department of Agriculture, was of the opinion that the specimens were identical with the Pea Mite of that State, and designated them as *Notophalus bicolor*. But Newman further points out that the western species was at one period considered to belong to the genus *Notophalus*.

Further, Dr. Davidson, of Waite Agricultural Research Institute, in a letter to the writer, states that the specimens forwarded to him are *Penthaleus destructor*. From the above evidence it would appear certain that the Red-legged Earth Mite of Western Australia is already in South Australia and extends into Victoria.

### ITS SOUTH AUSTRALIAN DISTRIBUTION.

The pest has been observed as being widely distributed in this State, and its presence has been noted in the following districts:—Mount Bryan, Booborowie, Redhill, Owen, Windsor, Riverton, Tarlee, Eudunda, along the River Murray at Murray Bridge, and at Mount Gambier, which indicates the pest is well established within our borders.

### THE PEST.

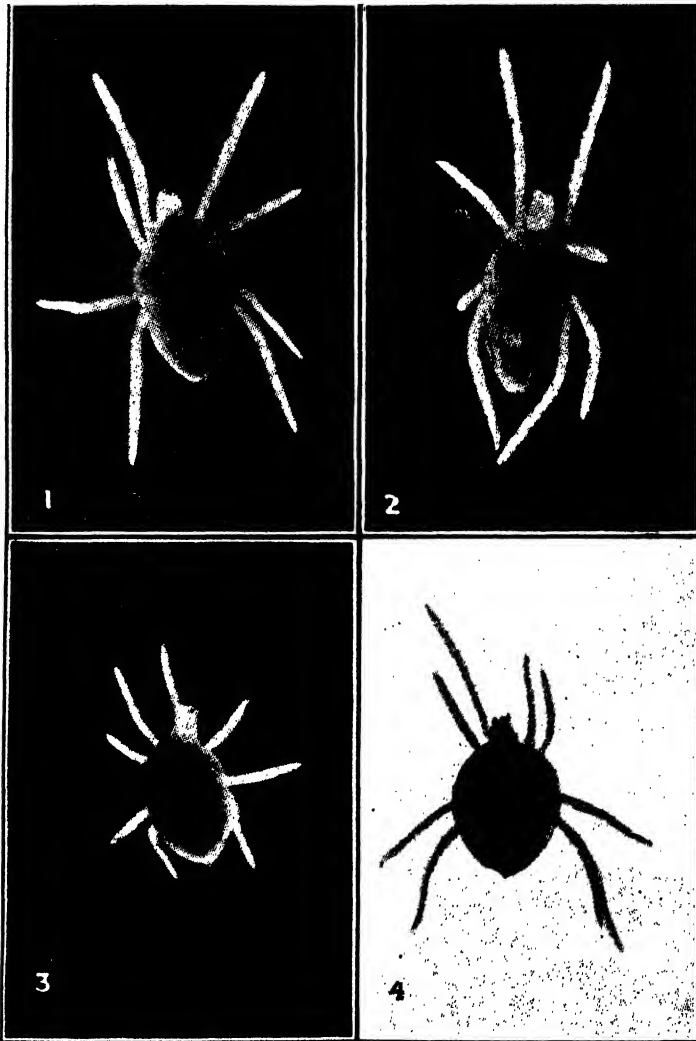
The mite is eight legged, of a blackish-purple body color, with reddish legs, being about one twenty-fifth of an inch in length. It moves rapidly over the surface of the ground, or host plants, but when on the latter, if disturbed, it quickly drops to the ground and rapidly seeks cover. The anterior pair of legs appear to function as antennae, being frequently waved high in the air as the mite travels.

### ITS LIFE HISTORY.

It makes its appearance in early autumn, after the first rains, and continues its ravages until the advent of warm weather. Prior to the dying off of the adults at the approach of summer, the females lay eggs capable of withstanding arid conditions, thus being the means of carrying over from season to season.



With the return of more humid conditions the eggs hatch, when a six-legged larva emerges. In a few days, however, the larva undergoes several moults and emerges as an eight-legged mite



*Illustrations from Leaflet No. 106, Department of Agriculture, Western Australia.]*

1. Adult female, dorsal view, magnified by 20.
2. Adult female, ventral view, magnified by 20.
3. Adult male, magnified by 20.
4. Adult female, ventral view, showing eggs in body magnified by 20.

#### COMPARISON WITH THE LUCERNE FLEA (*Smynturus viridis*).

Although outwardly the ravages of these two pests are similar, and their ultimate result the same, they in no way resemble each other as to color, shape, or manner of feeding. In regard to the feeding habits of the flea, Holdaway describes its mode of feeding "as a combination of gnawing and chiselling, consuming one epidermis and the underlying mesophyll tissue down to the other epidermis." While Newman describes that of the mite "rasping rather than for piercing; the surface of the leaf is broken, and the sap sucked up, the whole of the green parts removed."



Thus it will be seen that whereas the use of arsenical sprays may be helpful against the flea, they cannot be of use against the mite.

The season of activity is identical, and the two pests can be found working on the same plants at the same time.

#### COMPARED WITH THE RED SPIDER (*Bryobia pretiosa*).

It becomes evident upon comparison that the Red Spider is a web insect, whereas the mite is not. Further, the Red Spider does not readily drop to or travel over the surface of the soil in the rapid manner so characteristic of the mite. Finally the mite makes its appearance in the cooler, damper periods of the year, whereas the spider is prevalent only during the warmer months.

#### CONTROL.


Satisfactory means of control have yet to be evolved, but as a means of prevention the use of any well-known contact spray can give some protection to plants.

In gardens care should be exercised in obtaining seedlings from districts free from the pest, or the plants should be carefully dipped prior to planting in some recognised spraying solution. Carefully removing all rubbish and litter from the soil and deep digging also assist, while seedbeds may be protected by a trail of phenol, or borders upon which tanglefoot has been spread. The use of powdered naphthalene is in a slight way effective, but the greatest control in field conditions will be effected by fallowing.

#### HOST PLANTS.

The mite is a most cosmopolitan feeder, attacking all winter growing plants, but has a special liking for the more luscious types, such as Chick Weed (*Stellaria media*), Cape Weed (*Cryptostemma calceolaceum*), Peas, Beet, and Potatoes.

*Literature cited.*—L. J. Newman, Leaflet No. 106, Western Australian Department of Agriculture. F. G. Holdaway, Pamphlet No. 4, Council for Scientific and Industrial Research.



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**THIS WAY & WITH THIS MACHINE  
THE MONKEY GRUBBER**

Is the unrivalled method of clearing land. Of special design, and constructed to give great power in a compact and portable unit, trees and stumps are pulled cleanly, leaving less roots and snags to run. A Rope Shortener, together with simple and complete sturdy rope fittings, make extra savings in time. Yields move up and costs come down.

ADELAIDE STOCKISTS—Australasian Implement Co., Colton Palmer & Preston, Harris Scarfe Ltd., McPhersons Pty. Ltd., South Australian Farmers' Union.

**A PRODUCT OF THE JACK PEOPLE**

**TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.**



# NARRUNG HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                   |                        |                            | Butterfat.              |                        |                            | Average Test. |
|----------|------------------------------|------------------------------|-------------------------|------------------------|----------------------------|-------------------------|------------------------|----------------------------|---------------|
|          |                              |                              | Per Herd during August. | Per Cow during August. | Per Cow October to August. | Per Herd during August. | Per Cow during August. | Per Cow October to August. |               |
|          |                              |                              | Lbs.                    | Lbs.                   | Lbs.                       | Lbs.                    | Lbs.                   | Lbs.                       | %             |
| 5/C....  | 30                           | 27-06                        | 18,308                  | 610-27                 | 5,327-67                   | 887-64                  | 29-59                  | 266-76                     | 4-85          |
| 5/D....  | 33-81                        | 31-29                        | 22,972                  | 645-12                 | 5,121-93                   | 1,165-44                | 32-68                  | 269-11                     | 5-09          |
| 5/E....  | 38-06                        | 31-19                        | 20,333                  | 534-23                 | 4,795-67                   | 1,053-42                | 27-68                  | 258-96                     | 5-18          |
| 5/F....  | 19                           | 15-08                        | 10,406½                 | 547-71                 | 4,327-57                   | 426-44                  | 22-44                  | 189-61                     | 4-10          |
| 5/O....  | 27                           | 22-52                        | 14,713½                 | 544-94                 | 4,708-30                   | 731-13                  | 27-08                  | 248-94                     | 4-97          |
| 5/R....  | 45-97                        | 35-42                        | 20,858                  | 449-38                 | 3,704-62                   | 891-38                  | 19-39                  | 165-22                     | 4-31          |
| 5/S....  | 30                           | 28-74                        | 21,802½                 | 710-10                 | 4,746-86                   | 1,010-39                | 33-88                  | 239-87                     | 4-77          |
| 5/T....  | 21                           | 17-81                        | 15,519                  | 739-00                 | 4,960-95                   | 715-29                  | 34-06                  | 234-49                     | 4-61          |
| 5/U....  | 19-23                        | 18-23                        | 20,135                  | 1,047-03               | 9,012-07                   | 902-24                  | 46-92                  | 415-43                     | 4-48          |
| 5/V....  | 25                           | 22-31                        | 12,497½                 | 499-90                 | 3,662-35                   | 621-09                  | 24-84                  | 183-94                     | 4-97          |
| 5/Y....  | 28-61                        | 20                           | 12,842½                 | 451-19                 | 6,044-41                   | 701-13                  | 24-64                  | 337-62                     | 5-45          |
| 5/Z....  | 30-45                        | 27-77                        | 24,692                  | 810-90                 | 7,457-12                   | 1,165-29                | 38-26                  | 361-40                     | 4-72          |
| 5/AA.... | 17-42                        | 14-77                        | 4,549                   | 261-16                 | 4,410-23                   | 254-61                  | 14-62                  | 241-77                     | 5-06          |
| 5/CC.... | 34-42                        | 32-81                        | 20,798½                 | 637-81                 | 3,965-44                   | 867-28                  | 26-64                  | 172-14                     | 4-17          |
| 5/DD.... | 21-55                        | 16-29                        | 9,337½                  | 433-29                 | 5,063-49                   | 517-59                  | 24-02                  | 207-15                     | 5-54          |
| 5/EE.... | 17                           | 15-97                        | 11,690½                 | 687-68                 | 4,948-46                   | 592-23                  | 34-84                  | 260-95                     | 5-07          |
| 5/GG.... | 18                           | 13-06                        | 6,606                   | 367-00                 | 4,574-00                   | 310-95                  | 17-28                  | 222-90                     | 4-71          |
| 5/HH.... | 18                           | 13-97                        | 7,346                   | 408-11                 | 3,865-34                   | 329-36                  | 18-30                  | 184-11                     | 4-48          |
| 5/II.... | 23                           | 22-29                        | 18,176                  | 649-14                 | 5,988-91                   | 825-33                  | 29-48                  | 284-95                     | 4-54          |
| 5/JJ.... | 28-35                        | 25-42                        | 24,098½                 | 850-03                 | 5,729-73                   | 1,004-22                | 35-42                  | 248-37                     | 4-17          |
| 5/KK.... | 21-45                        | 19-45                        | 11,537½                 | 537-87                 | 5,087-88                   | 534-95                  | 24-94                  | 240-54                     | 4-64          |
| 5/LL.... | 24-68                        | 23-32                        | 11,476½                 | 465-01                 | 4,466-26                   | 540-04                  | 21-88                  | 205-87                     | 4-71          |
| Means .  | 26-23                        | 22-49                        | 15,454-36               | 589-25                 | 5,024-62                   | 729-70                  | 27-82                  | 246-60                     | 4-72          |

# LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                   |                        |                             | Butterfat.              |                        |                             | Average Test. |
|----------|------------------------------|------------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|-----------------------------|---------------|
|          |                              |                              | Per Herd during August. | Per Cow during August. | Per Cow December to August. | Per Herd during August. | Per Cow during August. | Per Cow December to August. |               |
|          |                              |                              | Lbs.                    | Lbs.                   | Lbs.                        | Lbs.                    | Lbs.                   | Lbs.                        | %             |
| 6B....   | 20                           | 16-16                        | 13,008                  | 650-40                 | 2,936-57                    | 506-99                  | 25-35                  | 196-55                      | 3-90          |
| 6/C....  | 20-42                        | 25-42                        | 21,716                  | 821-95                 | 4,618-38                    | 836-16                  | 31-65                  | 201-45                      | 3-85          |
| 6/E....  | 21-58                        | 20-87                        | 10,606½                 | 491-45                 | 3,066-28                    | 473-20                  | 21-93                  | 126-68                      | 4-46          |
| 6/F....  | 23-48                        | 22-48                        | 23,924½                 | 1,018-90               | 5,005-65                    | 1,067-70                | 45-47                  | 232-77                      | 4-46          |
| 6/I....  | 17                           | 13-94                        | 8,205½                  | 482-68                 | 2,905-90                    | 359-40                  | 21-14                  | 126-16                      | 4-38          |
| 6/Q....  | 22-07                        | 17-77                        | 9,288½                  | 420-86                 | 3,800-61                    | 405-70                  | 18-38                  | 188-05                      | 4-37          |
| 6/R....  | 22-77                        | 17-90                        | 11,245                  | 498-85                 | 2,583-88                    | 572-36                  | 25-14                  | 139-23                      | 5-09          |
| 6/U....  | 26                           | 19-32                        | 6,881                   | 264-65                 | 2,244-66                    | 290-27                  | 11-16                  | 95-96                       | 4-22          |
| 6/W....  | 24                           | 20-10                        | 12,386                  | 516-10                 | 4,284-87                    | 566-49                  | 23-61                  | 207-51                      | 4-57          |
| 6/X....  | 25-58                        | 18-94                        | 13,194                  | 515-79                 | 6,905-86                    | 577-41                  | 22-57                  | 277-73                      | 4-38          |
| 6/Y....  | 20                           | 14-55                        | 10,967                  | 548-35                 | 3,599-90                    | 501-56                  | 25-08                  | 157-34                      | 4-57          |
| 6/BB.... | 18                           | 11-16                        | 4,380                   | 243-33                 | 2,129-47                    | 178-55                  | 9-64                   | 96-27                       | 3-96          |
| 6/DD.... | 31                           | 21-29                        | 13,051                  | 421-00                 | 3,940-18                    | 575-58                  | 18-57                  | 175-58                      | 4-41          |
| 6/EE.... | 49                           | 34-42                        | 17,857                  | 364-43                 | 4,632-75                    | 785-18                  | 16-02                  | 207-83                      | 4-40          |
| 6/FF.... | 26                           | 16-61                        | 10,031                  | 385-81                 | 3,443-65                    | 898-43                  | 15-32                  | 158-26                      | 3-97          |
| 6/II.... | 35                           | 20-26                        | 13,353                  | 381-51                 | 5,136-10                    | 605-83                  | 17-31                  | 234-26                      | 4-54          |
| 6/JJ.... | 19-71                        | 16-87                        | 9,343½                  | 474-05                 | 5,139-79                    | 449-86                  | 22-82                  | 240-83                      | 4-81          |
| 6/KK.... | 26-87                        | 21-16                        | 10,147½                 | 377-65                 | 5,036-57                    | 418-27                  | 15-57                  | 221-18                      | 4-12          |
| 6/LL.... | 24-36                        | 18-32                        | 8,193                   | 336-33                 | 4,718-62                    | 321-17                  | 13-18                  | 196-65                      | 3-92          |
| 6/MM.... | 15-19                        | 13-71                        | 7,960                   | 524-08                 | 3,950-09                    | 362-88                  | 23-39                  | 188-79                      | 4-56          |
| 6/NN.... | 19                           | 18                           | 6,401½                  | 336-92                 | 3,148-74                    | 294-44                  | 15-50                  | 144-04                      | 4-60          |
| 6/OO.... | 19                           | 17                           | 10,410                  | 547-90                 | 4,718-53                    | 469-20                  | 24-70                  | 212-72                      | 4-50          |
| Means .  | 24-18                        | 18-92                        | 11,479-48               | 474-69                 | 4,070-16                    | 500-53                  | 20-70                  | 182-30                      | 4-36          |



# THE HILLS HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR JULY, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      | Butterfat.            |                      | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|-----------------------|----------------------|---------------|
|          |                              |                              | Per Herd during July. | Per Cow during July. | Per Herd during July. | Per Cow during July. |               |
| 7/D      | 26                           | 23-06                        | Lbs. 15,222           | Lbs. 585-46          | Lbs. 630-32           | Lbs. 24-24           | % 4-14        |
| 7/E      | 27-51                        | 21-58                        | 13,410                | 487-46               | 547-34                | 19-90                | 4-08          |
| 7/H      | 7-94                         | 4-45                         | 3,189                 | 401-63               | 153-17                | 19-29                | 4-80          |
| 7/J      | 18-71                        | 17-97                        | 10,101                | 539-37               | 476-54                | 25-47                | 4-72          |
| 7/K      | 13                           | 9-77                         | 5,457                 | 419-77               | 246-07                | 18-93                | 4-51          |
| 7/L      | 25-84                        | 17-23                        | 5,846                 | 226-24               | 288-97                | 11-18                | 4-94          |
| 7/O      | 17                           | 8-87                         | 2,427                 | 142-79               | 126-47                | 7-44                 | 5-21          |
| 7/S      | 14                           | 13                           | 9,842                 | 703-03               | 522-17                | 37-30                | 5-21          |
| 7/T      | 10                           | 6                            | 3,441                 | 344-10               | 141-53                | 14-15                | 4-11          |
| 7/V      | 12                           | 3-97                         | 786                   | 65-60                | 41-93                 | 3-49                 | 5-33          |
| 7/W      | 19                           | 13-13                        | 7,513                 | 395-42               | 358-58                | 18-87                | 4-77          |
| 7/X      | 15                           | 9-97                         | 6,505                 | 433-67               | 261-75                | 17-45                | 4-02          |
| 7/Y      | 13-81                        | 11-68                        | 4,588                 | 332-26               | 227-40                | 16-47                | 4-96          |
| 7/Z      | 10                           | 8-08                         | 5,535                 | 553-55               | 240-82                | 24-08                | 4-35          |
| 7/AA     | 7                            | 5                            | 2,139                 | 305-57               | 108-57                | 15-51                | 5-08          |
| 7/BB     | 13                           | 7-45                         | 4,749                 | 365-34               | 218-03                | 16-77                | 4-59          |
| 7/DD     | 9-97                         | 6-13                         | 3,652                 | 366-30               | 192-15                | 19-27                | 5-26          |
| 7/EE     | 28-77                        | 21-32                        | 9,520                 | 330-90               | 414-05                | 14-39                | 4-35          |
| 7/FF     | 11-97                        | 6-58                         | 5,212                 | 435-46               | 218-44                | 18-25                | 4-19          |
| 7/GG     | 10                           | 7-23                         | 1,495                 | 149-55               | 91-49                 | 9-16                 | 6-12          |
| 7/HH     | 17                           | 14-77                        | 7,776                 | 457-44               | 320-97                | 18-88                | 4-13          |
| Means    | 15-60                        | 11-33                        | 6,114-71              | 392-07               | 277-46                | 17-79                | 4-54          |

## LACK OF ARSENIC TO BLAME !

### ON THE QUESTION OF INEFFICIENT SHEEP DIPS—

Many dips on the market contain a low percentage of arsenic, yet they are called ARSENICAL DIPS, but are inefficient.

## YOUNG'S SHEEP DIP

(POWDER)

complies with the requirements of the Stock and Brands Department for South Australia, and contains considerably more than the percentage of Arsenic stipulated under the Act, and will KILL TICK and LICE, and resist the Blowfly attack.

Try also YOUNG'S BRACKISH WATER SHEEP DIP. Mixes readily with Fresh or Brackish Water.

FROM ALL STORES.

PARTICULARS FROM—

# Colton, Palmer & Preston, Ltd.

Sole Agents.

CURRIE ST., ADELAIDE.



## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### CONFERENCE OF MURRAY LANDS BRANCHES.

The eleventh Annual Conference of Agricultural Bureaux situated in the Murray Mallee Lands Districts was held at Alawoona on Tuesday, September 30th. Messrs. H. S. Taylor (member of the Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. C. Scott (Supervisor of Experimental Work), L. Smith (Manager Veitch Experimental Farm), R. L. Griffith (District Agricultural Instructor), P. H. Suter (Senior Dairy Instructor), C. McKenna, B.V.Sc., M.R.C.V.S. (Government Veterinary Officer), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau) represented the Department of Agriculture, and there was an excellent attendance of delegates from the following Branches:—Karoonda, Caliph, Paruna, Alawoona, Taplan, Bugle, Nunkeri, Yurgo, Wanbi, Loxton, Porrika, and Copeville.

#### THE OPENING ADDRESS.

Mr. W. Paul (Chairman of the Alawoona Branch of the Agricultural Bureau) presided over the Conference. Mr. H. S. Taylor (member of the Advisory Board of Agriculture), in opening the Conference, spoke of his first visit to Alawoona, nearly 20 years ago, on the occasion of a Parliamentary celebration of the completion of the Brown's Well line as far as Wanbi. A drive, which was largely a walk, over the interminable sandhills between Veitch and Alawoona, and the stunted nature of the mallee had not favorably impressed the party used to the much larger growth of the scrub further north; and he recalled the grave doubts expressed by that sturdy pioneer, the late Hon. John Lewis, as he surveyed the unbroken mallee at Wanbi, as to whether anyone could ever make a living in such country. The speaker, remembering his own father-in-law had been starved out of the Mindarie country—which he was the first man to take up, nearly half a century earlier—found himself sharing these doubts.

By their enterprise, hard work, and courage, backed by the splendid spirit of their wives and womenfolk, the mallee farmers had turned this land, for so long regarded as useless, into a valuable asset to the State. They had proved its possibilities and demonstrated that in average seasons good crops could be grown in it.

They had done more than add to the wealth of the State. There was a profound and pregnant truth in the old Greek fable of Antaeus. It was from the land that the nation drew not only its material wealth but those moral qualities of courage, steadfastness, self-reliance, and endurance, and, he would add, faith and unconquerable hope, on which a nation relied in times of stress and crisis, and which were the ultimate foundations of national greatness.

Napoleon and Foch after him had stressed the importance of the moral factor in contributing to victory, and it was on the moral qualities developed in the struggle with Nature's stern forces that Australia must rely to carry it through the critical times now confronting it.

The mallee farmers and their families had had ample occasion during three years of unparalleled drought to call up their reserves of courage, fortitude, and hope. They had borne themselves magnificently, and it looked, though the issue was still uncertain, as though they had won out triumphantly over the adverse forces of Nature—only to be faced by problems as difficult in the economic world that were not of Nature's making but were due to the mistakes and short-sightedness of man.



That they would emerge from the struggle, not without honorable scars, but victorious and with unconquered spirit, must be the fervent hope of every true Australian. Dark as was the price outlook at present, the Commonwealth Statistician, Mr. Wickens, had lately forecasted a realisation of 4s per bushel on the coming season's wheat, and he was delighted to learn that Professor Perkins, in large measure, shared in Mr. Wickens's optimism with respect to comparatively good prices in the near future. He trusted that the Conference deliberations would contribute to the solution of the difficult problems with which the mallee farmer was faced.

The following papers were read and discussed:—"Farm Book-keeping," Mr. W. H. Todd (Caliph); "Rural Economics," Mr. T. B. Flint (Alawoona); "Horse Management," Mr. W. G. Sutherland (Copeville).

During the session devoted to Free Parliament, Conference resolved, on the motion of Mr. T. Flint (Alawoona), seconded by Mr. Edwards (Bugle), "That the Department of Agriculture be requested to continue to carry on the work of investigating costs relating to the growing of wheat."

It was decided to hold the 1931 Conference at Alawoona.

Mr. Paull (Alawoona) moved—"That this Conference views with alarm the press reports that there was a possibility of the Veitch Experimental Farm being closed, and enters a strong protest against any such action if contemplated by the Government." The motion was seconded by Mr. W. Todd (Caliph) and carried.

On the motion of Mr. Paull (Alawoona), seconded by Mr. T. Flint, it was resolved—"That the Government be asked to secure two entires (Clydesdales), to be stationed at Veitch Experimental Farm, and travel the district."

It was decided—"That this Conference desires to bring to the notice of the authorities the desirability of establishing a branch of the State Bank at Alawoona at an early date in order to help the development of the district."

Mr. F. Richards (Caliph) moved, and Mr. G. Sutherland (Copeville) seconded—"That prior to the 1931 Conference each Branch represented appoint two of their members to act as delegates to vote on business matters that come before the Conference."

An interesting discussion took place on reducing the costs of production in the mallee, and, following a request from the Conference, Professor Perkins undertook to address the 1931 gathering on the subject of reducing costs of production and the best methods to adopt to increase production.

On the motion of Mr. G. Sutherland (Copeville), seconded by Mr. Collins (Copeville), it was resolved—"That the Advisory Board be requested to consider the advisability of dividing the present Murray Mallee Lands Conference district into two Conferences."

The Conference concluded with an address by Mr. H. B. Barlow (Chief Dairy Instructor) on "Dairying for Farmers in the Mallee Areas."

## **DAIRY FARMERS**

Have you tried feeding your cows on HALMEG LINSEED MEAL?  
It is the best Milk Producing Concentrate.

**DAIRY MEAL.**

**CALF FOOD.**

**STOCK LICKS.**

Manufactured on Our Premises.

**Charles Whiting & Chambers, Ltd.,**  
**13, PITT STREET, ADELAIDE.**



### DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD, & Co., LIMITED, reported on October 1st, 1930:—

**BUTTER.**—The production of butter in South Australia is now heavier than for many years past, due to the fact that nice growing weather has been experienced in most of the dairying districts, and supplies are still increasing each week. With the continuance of spring rains there is every probability of the season extending later than usual, which would mean that the production would maintain for some time yet. Meanwhile the surplus butter is being packed for London, and the standard is high. Rates have continued steady, but there is a weakening tendency in the London market which may be reflected in values a little later. Choiceest creamery fresh butter in bulk, 1s. 4½d. Prints and delivery extra. Second and third grades, 1s. 2½d. (These prices are subject to the stabilization levies.) Best separators, 1s. 1½d. to 1s. 2½d. Well-conditioned store and collectors', 10½d. to 11½d. per lb.

**EGGS.**—Very heavy supplies are now being marketed from all country districts, and owing to the lower prices ruling for grain the production throughout the State is likely to be a very heavy one. Meanwhile heavy quantities are being graded and packed for London, and the surplus is being absorbed by pulpers and picklers for winter use. The market is steady. Ordinary country eggs, hen, 6½d. per dozen; duck, 7½d. per dozen.

**CHEESE.**—The South-Eastern factories are producing very heavy quantities, and the season looks as though it will be almost a record one. Rates eased during the month, but so far there has not been much accumulation of stocks in the city, and local and Western Australian buyers are purchasing steadily from week to week. New makes, large to loaf, 7½d. to 8d. per lb. semi-matured and matured, to 1s. per lb.

**ALMONDS.**—The demand for almonds continues strong, and as the supplies coming forward are only limited, ready sales can be made for all lots offering. Kernels also are selling freely at quotations. Brandis, 8d. to 8½d. per lb.; mixed softshells, 7d. to 7½d.; hardshells, 4d. to 4½d.; kernels, 1s. 7½d. per lb.

**HONEY.**—The demand for honey is dull. Odd parcels of prime clear extracted are clearing, but most sales are hand to mouth purchases from small buyers. The sales of lower grades, however, are very limited, and heavy stocks are being held. Prime clear extracted in liquid condition, 4½d. to 5d.; best quality candied lots, 4½d. to 4¾d.; second grade honey, 2½d. to 3d. per lb.

**BACON.**—The demand for bacon has kept up well all things being considered, and as curers are able to obtain full supplies of live hogs ample quantities of all cuts of bacon and hams are being marketed from week to week. Values have been without much fluctuation. Best local sides, 11½d. to 1s.; best local factory cured middles, 11½d. to 1s.; large, 10d.; local rolls, 11½d. to 1s.; Geo. Farmer's "Sugar Cane" brand lard in packets, 11d. per lb. in bulk, 10d. per lb.; local lard, 10½d. per lb. in prints.

**LIVE POULTRY.**—The sales for live poultry have well maintained throughout the month. Demand was stimulated by the Agricultural Show held a few weeks back, but supplies since have been somewhat lower than usual, and buyers have been unable to obtain all their requirements. It is anticipated therefore that the strong demand will continue, and there is ample demand for all lots consigned. We advise consigning. Crates loaned on application. Prime roosters, 4s. 6d. to 5s. 6d.; nice-conditioned cockerels, 3s. 6d. to 4s. 3d.; fair-conditioned cockerels, 2s. 9d. to 3s. 3d.; chickens, lower; heavyweight hens, 3s. 6d. to 4s. 6d.; medium hens, 2s. 9d. to 3s. 4d.; light hens, 2s. 3d. to 2s. 6d.; couple of pens of weedy sorts, lower; geese, 4s. to 6s.; prime young Muscovy drakes, 4s. 6d. to 5s. 9d.; ducks, good conditioned, 3s. 6d. to 4s. 3d.; ducks, fair condition, 2s. 4d. to 3s.; ducklings, lower; turkeys, good to prime condition, 8d. to 11d. per lb. live weight; turkeys, fair condition, 6½d. to 7½d. per lb. live weight; turkeys, fattening sorts lower; pigeons, 7d. each.

**POTATOES.**—Best South-Eastern and Victorian, 6s. 6d. to 7s. 6d. per cwt.

**ONIONS.**—Best onions, 6s. per cwt.



## IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., AUGUST, 1930.

### IMPORTS.

#### *Interstate.*

|                                    |       |
|------------------------------------|-------|
| Apples (bushels) .. . . .          | 126   |
| Apples, Custard (bushels) .. . . . | 2     |
| Bananas (bushels) .. . . .         | 8,463 |
| Citrus—                            |       |
| Grape fruit (bushels) .. . . .     | 16    |
| Lemons (bushels) .. . . .          | 24    |
| Oranges (bushels) .. . . .         | 90    |
| Passion fruit (bushels) .. . . .   | 274   |
| Paw paws (bushel) .. . . .         | 1     |
| Pears (bushels) .. . . .           | 5     |

## VEGETABLES



***good health demands them!***

Only by eating vegetables frequently can we maintain our blood in good condition, and therefore, our health. This fact is not sufficiently realised.

Made in handy tablet form, Swallow & Ariell's Compressed Vegetables are equal in every way to fresh, as only water is removed, and their true flavour is retained. Easily prepared and economical—one pound of the compressed article goes as far as ten of the fresh—they take up so little space that they're easily stored.

With this product of Swallow & Ariell at hand you need never be short of health-giving vegetables. Buy a few packets now!

# SWALLOW & ARIELL'S COMPRESSED VEGETABLES



Imports and Exports of Fruits, Plants, &c., August, 1930—*continued.*

|                                       |        |
|---------------------------------------|--------|
| Pineapples (bushels) .. . . .         | 943    |
| Tomatoes (bushels) .. . . .           | 9      |
| Peanuts (bags) .. . . .               | 129    |
| Peanuts, kernels (bags) .. . . .      | 20     |
| Beans (bushels) .. . . .              | 13     |
| Cabbages (bags) .. . . .              | 2      |
| Carrots (bags) .. . . .               | 38     |
| Cauliflowers (bags) .. . . .          | 2      |
| Peas (bag) .. . . .                   | 1      |
| Potatoes (bags) .. . . .              | 27,880 |
| Potatoes, sweet (bushels) .. . . .    | 2      |
| Swedes (bags) .. . . .                | 35     |
| Bulbs (packages) .. . . .             | 63     |
| Plants (packages) .. . . .            | 95     |
| Roots (package) .. . . .              | 1      |
| Seeds (packages) .. . . .             | 86     |
| Trees, fruit (packages) .. . . .      | 60     |
| Trees, ornamental (packages) .. . . . | 2      |
| Wine casks (number) .. . . .          | 2,528  |
| <i>Fumigated—</i>                     |        |
| Plants (packages) .. . . .            | 12     |
| Trees, fruit (packages) .. . . .      | 55     |
| Trees, ornamental (packages) .. . . . | 2      |
| Wine casks (number) .. . . .          | 9      |
| <i>Rejected—</i>                      |        |
| Bananas (bushels) .. . . .            | 8      |
| Pineapples (bushels) .. . . .         | 3      |
| Secondhand casks (number) .. . . .    | 10     |

## OVERSEAS.

## (State Law.)

|                              |     |
|------------------------------|-----|
| Cocoanuts (package) .. . . . | 1   |
| Wine casks (number) .. . . . | 239 |

## Federal Quarantine Act.

|                     | Packages. | Lbs.      |
|---------------------|-----------|-----------|
| Seeds, &c. .. . . . | 1,513     | 211,058   |
|                     |           | No.       |
| Plants .. . . .     | 1         | 25        |
|                     |           | Sup. ft.  |
| Timber .. . . .     | 101,929   | 2,233,570 |

## EXPORTS.

## Federal Commerce Act.

|                               | Packages. |
|-------------------------------|-----------|
| England—Oranges .. . . .      | 169       |
| India—Apples .. . . .         | 518       |
| Potatoes .. . . .             | 6         |
| Oranges .. . . .              | 8         |
| Belgium—Oranges .. . . .      | 24        |
| Germany—Oranges .. . . .      | 12        |
| New Zealand—Lemons .. . . .   | 15        |
| Plants .. . . .               | 1         |
| Seeds .. . . .                | 12        |
| Fanning Island—Pears .. . . . | 2         |
| Apples .. . . .               | 3         |
| Oranges .. . . .              | 6         |
| Potatoes .. . . .             | 26        |
| Onions .. . . .               | 9         |
| Vegetables .. . . .           | 10        |

*Errata.*—June statement—Under heading "Overseas, State Law," add "Cocoanuts—3 packages."



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of September, 1930, also the average precipitation to the end of September, and the average annual rainfall.

| Station.                   | For Sep., 1930. | To end Sep., 1930. | Av'ge to end Sep. | Av'ge Annual Rain-fall. | Station.              | For Sep., 1930. | To end Sep., 1930. | Av'ge to end Sep. | Av'ge Annual Rain-fall. |
|----------------------------|-----------------|--------------------|-------------------|-------------------------|-----------------------|-----------------|--------------------|-------------------|-------------------------|
| FAR NORTH AND UPPER NORTH. |                 |                    |                   |                         | LOWER NORTH—continued |                 |                    |                   |                         |
| Oodnadatta .....           | —               | 1.60               | 3.50              | 4.78                    | Brinkworth .....      | 0.86            | 8.76               | 12.69             | 16.01                   |
| Marree .....               | 0.39            | 3.71               | 4.28              | 5.92                    | Blyth .....           | 1.38            | 8.59               | 13.50             | 16.94                   |
| Farina .....               | 0.48            | 4.18               | 4.93              | 6.53                    | Clare .....           | 1.86            | 14.95              | 20.02             | 24.67                   |
| Copley .....               | 0.33            | 5.13               | 6.18              | 8.04                    | Mintaro .....         | 2.09            | 14.78              | 19.00             | 23.51                   |
| Beltana .....              | 0.37            | 4.57               | 6.63              | 8.68                    | Watervale .....       | 1.71            | 12.39              | 22.05             | 27.24                   |
| Blinman .....              | 0.58            | 5.74               | 9.52              | 12.12                   | Auburn .....          | 1.59            | 13.51              | 19.48             | 24.12                   |
| Hookina .....              | 1.18            | 6.20               | 8.99              | 11.85                   | Hoyleton .....        | 0.89            | 6.85               | 13.89             | 17.58                   |
| Hawker .....               | 1.04            | 6.32               | 9.73              | 12.43                   | Balaklava .....       | 0.93            | 7.20               | 12.42             | 15.99                   |
| Wilson .....               | 0.65            | 5.82               | 9.24              | 12.01                   | Port Wakefield ..     | 0.52            | 5.63               | 10.60             | 13.08                   |
| Gordon .....               | 0.46            | 6.22               | 8.26              | 10.89                   | Terowie .....         | 0.88            | 5.55               | 10.35             | 13.58                   |
| Quorn .....                | 0.64            | 6.14               | 10.65             | 13.60                   | Yarcowie .....        | 0.72            | 5.61               | 10.77             | 13.83                   |
| Port Augusta .....         | 0.69            | 4.38               | 7.31              | 9.50                    | Hallett .....         | 1.05            | 8.78               | 12.94             | 16.55                   |
| Bruce .....                | 0.33            | 5.79               | 7.55              | 10.10                   | Mount Bryan ..        | 1.12            | 9.54               | 13.45             | 16.87                   |
| Hammond .....              | 0.42            | 5.28               | 8.83              | 11.54                   | Koorunga .....        | 1.24            | 9.34               | 14.35             | 18.00                   |
| Wilmington .....           | 0.78            | 7.44               | 14.25             | 17.78                   | Farrell's Flat ..     | 1.17            | 9.27               | 15.12             | 18.82                   |
| Willowie .....             | 0.75            | 10.20              | 9.47              | 12.27                   | WEST OF MURRAY RANGE. |                 |                    |                   |                         |
| Melrose .....              | 1.18            | 10.36              | 18.73             | 23.15                   | Manoora .....         | 1.22            | 10.76              | 15.05             | 18.97                   |
| Boooleroo Centre ..        | 0.92            | 8.63               | 12.09             | 15.41                   | Saddlegworth ..       | 1.24            | 11.87              | 15.69             | 19.65                   |
| Port Germein .....         | 0.84            | 6.90               | 9.75              | 12.56                   | Marrabel .....        | 1.76            | 12.71              | 15.97             | 19.92                   |
| Wirrabara .....            | 1.37            | 9.50               | 15.57             | 19.47                   | Riverton .....        | 1.67            | 11.50              | 16.76             | 20.86                   |
| Appila .....               | 1.06            | 6.97               | 11.51             | 15.01                   | Tarlee .....          | 1.49            | 10.77              | 14.43             | 18.16                   |
| Craddock .....             | 0.61            | 6.57               | 8.44              | 11.00                   | Stockport .....       | 1.41            | 11.09              | 13.28             | 16.88                   |
| Carrieton .....            | 0.78            | 7.50               | 9.59              | 12.47                   | Hamley Bridge ..      | 1.14            | 9.51               | 13.24             | 16.67                   |
| Johnburg .....             | 1.07            | 7.11               | 8.04              | 10.69                   | Kapunda .....         | 1.67            | 11.55              | 15.84             | 19.92                   |
| Eurelia .....              | 0.53            | 6.25               | 10.07             | 13.14                   | Freeling .....        | 1.33            | 10.34              | 14.25             | 18.03                   |
| Orroroo .....              | 0.78            | 6.95               | 10.41             | 13.36                   | Greenock .....        | 1.65            | 12.81              | 17.29             | 21.76                   |
| Nackara .....              | 1.00            | 7.37               | 8.76              | 11.71                   | Truro .....           | 1.78            | 11.27              | 16.13             | 20.21                   |
| Black Rock .....           | 0.63            | 6.32               | 9.70              | 12.57                   | Stockwell .....       | 1.94            | 12.87              | 16.08             | 20.30                   |
| Oodlawirra .....           | 0.87            | 7.35               | —                 | *                       | Nuriootpa .....       | 2.09            | 13.14              | 16.54             | 20.74                   |
| Peterborough .....         | 0.75            | 5.99               | 10.22             | 13.40                   | Angaston .....        | 2.38            | 13.80              | 18.06             | 22.58                   |
| Yongala .....              | 1.18            | 7.25               | 11.15             | 14.57                   | Tanunda .....         | 2.13            | 12.98              | 17.91             | 22.20                   |
| NORTH-EAST:                |                 |                    |                   |                         | Lyndoch .....         | 2.55            | 14.94              | 19.08             | 23.71                   |
| Yunta .....                | 0.67            | 3.97               | 6.37              | 8.53                    | Williamstown ..       | 3.20            | 18.13              | 22.78             | 27.84                   |
| Waukarunga .....           | 0.72            | 3.72               | 6.11              | 8.38                    | ADELAIDE PLAINS.      |                 |                    |                   |                         |
| Mannahill .....            | 0.53            | 5.27               | 6.09              | 8.39                    | Owen .....            | 1.23            | 9.88               | —                 | *14.22                  |
| Cockburn .....             | 0.76            | 3.42               | 6.03              | 8.04                    | Mallala .....         | 1.05            | 8.87               | 13.38             | 16.77                   |
| Broken Hill, N.S.W.        | 0.93            | 5.18               | 7.33              | 9.71                    | Roseworthy .....      | 1.59            | 10.35              | 13.85             | 17.46                   |
| LOWER NORTH.               |                 |                    |                   |                         | Gawler .....          | 1.34            | 10.61              | 15.36             | 19.14                   |
| Port Pirie .....           | 0.75            | 5.89               | 10.48             | 13.38                   | Two Wells .....       | 0.97            | 8.64               | 12.75             | 15.88                   |
| Port Broughton ..          | 0.59            | 7.35               | 11.41             | 14.08                   | Virginia .....        | 1.28            | 9.56               | 13.89             | 17.30                   |
| Bute .....                 | 0.80            | 7.71               | 12.65             | 15.56                   | Smithfield .....      | 1.41            | 10.75              | 13.92             | 17.58                   |
| Laura .....                | 1.11            | 8.10               | 14.46             | 18.20                   | Salisbury .....       | 1.49            | 11.64              | 15.09             | 18.63                   |
| Caltowie .....             | 1.14            | 7.99               | 13.30             | 16.94                   | Adelaide .....        | 2.56            | 14.02              | 17.23             | 21.16                   |
| Jamestown .....            | 1.31            | 9.09               | 14.05             | 17.95                   | Glen Osmond ..        | 3.40            | 16.88              | 21.46             | 26.19                   |
| Gladstone .....            | 0.94            | 7.90               | 12.95             | 16.44                   | Magill .....          | 2.70            | 16.50              | 21.03             | 25.77                   |
| Crystal Brook ....         | 0.83            | 7.97               | 12.58             | 15.89                   | MOUNT LOFTY RANGES.   |                 |                    |                   |                         |
| Georgetown .....           | 1.05            | 9.26               | 14.77             | 18.53                   | Teatree Gully ...     | 2.59            | 15.43              | 22.49             | 27.70                   |
| Narridy .....              | 1.11            | 8.84               | 12.88             | 15.99                   | Stirling West ..      | 6.29            | 31.50              | 39.05             | 47.04                   |
| Redhill .....              | 1.06            | 0.09               | 13.46             | 17.02                   | Uraidla .....         | 5.51            | 26.62              | 36.88             | 44.38                   |
| Spalding .....             | 1.28            | 7.99               | 15.20             | 19.53                   | Clarendon .....       | 3.83            | 20.82              | 27.30             | 33.03                   |
| Gulnare .....              | 1.13            | 9.39               | 14.85             | 18.92                   | Morphett Vale ..      | 2.30            | 14.74              | 18.61             | 22.78                   |
| Yaaka .....                | 1.09            | 9.13               | 12.28             | 15.40                   | Noarlunga .....       | 1.78            | 12.65              | 16.98             | 20.40                   |
| Koolunga .....             | 0.78            | 7.62               | 12.37             | 15.61                   | Willunga .....        | 2.81            | 17.09              | 21.69             | 26.07                   |
| Snowtown .....             | 0.79            | 7.96               | 12.68             | 15.78                   | Aldinga .....         | 2.34            | 13.05              | 16.88             | 20.43                   |



## RAINFALL—continued.

| Station.                  | For<br>Sep.,<br>1930. | To<br>end<br>Sep.,<br>1930 | Av'ge<br>to end<br>Sep. | Av'ge<br>Annual<br>Rain-<br>fall. | Station.                      | For<br>Sep.,<br>1930. | To<br>end<br>Sep.,<br>1930. | Av'ge<br>to end<br>Sep. | Av'ge<br>Annual<br>Rain-<br>fall. |
|---------------------------|-----------------------|----------------------------|-------------------------|-----------------------------------|-------------------------------|-----------------------|-----------------------------|-------------------------|-----------------------------------|
| MOUNT LOFTY RANGES—contd. |                       |                            |                         |                                   | WEST OF SPENCER'S GULF—contd. |                       |                             |                         |                                   |
| Myponga .....             | 3.10                  | 21.40                      | 24.26                   | 29.62                             | Carrow .....                  | 0.63                  | 5.78                        | 10.35                   | 13.47                             |
| Normanville .....         | 2.11                  | 14.35                      | 17.33                   | 20.75                             | Arno Bay .....                | 0.63                  | 8.37                        | 9.88                    | 12.48                             |
| Yankalilla .....          | 2.31                  | 14.17                      | 19.33                   | 23.61                             | Cleve .....                   | 0.96                  | 9.82                        | 11.75                   | 14.63                             |
| Mount Pleasant .....      | 2.94                  | 17.77                      | 22.45                   | 27.38                             | Cowell .....                  | 0.33                  | 6.02                        | 8.85                    | 11.25                             |
| Birdwood .....            | 3.33                  | 19.00                      | 24.05                   | 29.41                             | Miltalie .....                | 0.61                  | 7.81                        | 10.82                   | 13.89                             |
| Gumeracha .....           | 4.24                  | 22.37                      | 27.50                   | 33.54                             | Chandada .....                | 0.81                  | 8.22                        | —                       | —                                 |
| Millbrook Reservoir ..... | 4.38                  | 21.99                      | 28.79                   | 36.18                             |                               |                       |                             |                         |                                   |
| Tweedvale .....           | 4.89                  | 25.15                      | 29.88                   | 36.08                             | YORKE PENINSULA.              |                       |                             |                         |                                   |
| Woodside .....            | 3.97                  | 20.61                      | 26.75                   | 32.47                             | Walleroo .....                | 0.53                  | 7.43                        | 11.48                   | 13.99                             |
| Ambleside .....           | 4.67                  | 23.07                      | 28.93                   | 35.09                             | Kadina .....                  | 0.77                  | 7.66                        | 12.98                   | 15.77                             |
| Nairne .....              | 3.53                  | 18.96                      | 23.13                   | 28.29                             | Moonta .....                  | 0.78                  | 8.42                        | 12.46                   | 15.16                             |
| Mount Barker .....        | 4.82                  | 25.75                      | 26.04                   | 31.66                             | Paskeville .....              | 0.99                  | 7.38                        | 12.85                   | 15.67                             |
| Echunga .....             | 3.94                  | 20.66                      | 27.50                   | 33.35                             | Maitland .....                | 1.59                  | 11.84                       | 16.60                   | 20.03                             |
| Macclesfield .....        | 3.51                  | 18.28                      | 25.00                   | 30.72                             | Ardrossan .....               | 1.07                  | 8.83                        | 11.46                   | 14.02                             |
| Meadows .....             | 4.05                  | 21.32                      | 29.87                   | 36.42                             | Port Victoria .....           | 1.44                  | 10.30                       | 12.65                   | 15.41                             |
| Strathalbyn .....         | 1.83                  | 11.20                      | 15.73                   | 19.43                             | Curramulka .....              | 1.74                  | 11.50                       | 14.70                   | 17.98                             |
| MURRAY FLATS AND VALLEY   |                       |                            |                         |                                   | Minlaton .....                | 2.17                  | 10.79                       | 14.82                   | 17.98                             |
| Meningie .....            | 2.40                  | 11.25                      | 15.14                   | 18.52                             | Pt. Vincent .....             | 1.72                  | 9.84                        | 11.80                   | 14.54                             |
| Milang .....              | 1.31                  | 8.57                       | 11.71                   | 15.13                             | Brentwood .....               | 1.77                  | 10.10                       | 12.64                   | 15.67                             |
| Langhorne's Creek .....   | 1.39                  | 10.43                      | 11.62                   | 14.84                             | Stansbury .....               | 1.59                  | 9.94                        | 13.97                   | 16.95                             |
| Wellington .....          | 1.42                  | 9.61                       | 11.48                   | 14.67                             | Warooka .....                 | 1.46                  | 11.33                       | 14.87                   | 17.67                             |
| Tailem Bend .....         | 1.64                  | 9.86                       | 11.33                   | 14.77                             | Yorketown .....               | 2.48                  | 12.39                       | 14.16                   | 17.04                             |
| Murray Bridge .....       | 0.99                  | 7.14                       | 10.80                   | 13.84                             | Edithburgh .....              | 2.42                  | 10.24                       | 13.60                   | 16.52                             |
| Callington .....          | 1.60                  | 9.49                       | 12.25                   | 15.40                             |                               |                       |                             |                         |                                   |
| Mannum .....              | 0.87                  | 7.17                       | 9.18                    | 11.56                             | SOUTH AND SOUTH-EAST.         |                       |                             |                         |                                   |
| Palmer .....              | 1.55                  | 9.83                       | 12.29                   | 15.59                             | Cape Borda .....              | 3.37                  | 24.08                       | 21.53                   | 24.81                             |
| Sedan .....               | 1.12                  | 7.90                       | 9.69                    | 12.24                             | Kingscote .....               | 2.54                  | 19.69                       | 16.20                   | 19.07                             |
| Swan Reach .....          | 0.82                  | 5.69                       | 8.28                    | 10.77                             | Penneshaw .....               | 2.16                  | 11.20                       | 15.24                   | 18.76                             |
| Blanchetown .....         | 0.64                  | 5.23                       | 8.63                    | 11.24                             | Victor Harbor .....           | 2.31                  | 14.43                       | 17.68                   | 21.32                             |
| Eudunda .....             | 1.33                  | 11.13                      | 13.58                   | 17.19                             | Port Elliot .....             | 1.72                  | 11.43                       | 16.23                   | 20.05                             |
| Sutherlands .....         | 0.72                  | 7.24                       | 7.67                    | 10.87                             | Goolwa .....                  | 1.45                  | 10.63                       | 14.52                   | 17.90                             |
| Morgan .....              | 0.40                  | 5.73                       | 6.89                    | 9.23                              | Copeville .....               | 0.84                  | 6.06                        | —                       | 11.58                             |
| Waikerie .....            | 0.49                  | 6.68                       | 7.32                    | 9.71                              | Meribah .....                 | 0.56                  | 6.34                        | 8.49                    | *11.70                            |
| Overland Corner .....     | 0.23                  | 5.83                       | 7.92                    | 10.58                             | Alawoona .....                | 0.56                  | 6.55                        | 8.11                    | *10.20                            |
| Loxton .....              | 0.70                  | 7.27                       | 9.17                    | 11.80                             | Mindarie .....                | 0.74                  | 6.99                        | 8.99                    | 12.46                             |
| Renmark .....             | 0.83                  | 5.96                       | 7.90                    | 10.60                             | Sandalwood .....              | 0.84                  | 8.14                        | 10.56                   | 13.90                             |
| WEST OF SPENCER'S GULF.   |                       |                            |                         |                                   | Karoonda .....                | 1.14                  | 9.43                        | 11.21                   | 14.48                             |
| Eucula .....              | 0.19                  | 11.60                      | —                       | *                                 | Pinnaroo .....                | 0.95                  | 7.30                        | 11.67                   | 14.94                             |
| Nullarbor .....           | 0.12                  | —                          | —                       | —                                 | Parilla .....                 | 1.04                  | 7.42                        | 11.09                   | 14.15                             |
| Fowler's Bay .....        | 0.26                  | 5.44                       | 10.09                   | 11.85                             | Lameroo .....                 | 1.39                  | 9.27                        | 12.77                   | 16.33                             |
| Penong .....              | 0.48                  | 5.31                       | 10.13                   | 12.12                             | Parrakie .....                | 1.62                  | 9.52                        | 11.39                   | 14.54                             |
| Koonibba .....            | 0.40                  | 5.57                       | 10.05                   | *                                 | Geranium .....                | 1.74                  | 10.50                       | 13.14                   | 16.54                             |
| Denial Bay .....          | 0.28                  | 5.56                       | 9.91                    | *11.56                            | Peake .....                   | 1.52                  | 9.53                        | 12.94                   | 16.41                             |
| Ceduna .....              | 0.31                  | 5.72                       | 8.00                    | 9.92                              | Cooke's Plains .....          | 1.65                  | 9.47                        | 12.22                   | 15.46                             |
| Smoky Bay .....           | 0.37                  | 4.26                       | 8.81                    | 10.61                             | Coomandook .....              | 1.94                  | 10.27                       | 13.73                   | 17.45                             |
| Wirrulla .....            | 0.85                  | 6.53                       | —                       | *                                 | Coonalpyn .....               | 2.59                  | 10.98                       | 13.97                   | 17.52                             |
| Streaky Bay .....         | 0.38                  | 6.80                       | 12.89                   | 14.95                             | Tintinara .....               | 2.57                  | 11.12                       | 14.91                   | 18.78                             |
| Talia .....               | 0.59                  | 6.97                       | 12.62                   | 15.27                             | Keith .....                   | 2.67                  | 13.04                       | 14.26                   | 17.96                             |
| Port Elliot .....         | 0.86                  | 7.46                       | 10.12                   | 16.53                             | Bordertown .....              | 2.63                  | 12.93                       | 15.32                   | 19.39                             |
| Port Lincoln .....        | 2.03                  | 12.81                      | 16.49                   | 19.50                             | Wolsley .....                 | 2.72                  | 14.36                       | 14.52                   | 18.36                             |
| Cummins .....             | 1.81                  | 10.30                      | 14.90                   | 17.86                             | Frances .....                 | 3.12                  | 16.44                       | 15.60                   | 19.96                             |
| Yeelanna .....            | 1.76                  | 8.86                       | 13.42                   | 16.12                             | Naracoorte .....              | 3.51                  | 18.85                       | 18.02                   | 22.57                             |
| Ungarra .....             | 1.72                  | 10.84                      | 13.59                   | 16.85                             | Penola .....                  | 3.41                  | 20.43                       | 20.96                   | 26.19                             |
| Rudall .....              | 1.03                  | 9.12                       | 9.98                    | *12.14                            | Lucindale .....               | 3.20                  | 18.45                       | 18.82                   | 23.07                             |
| Darke's Peak .....        | 0.99                  | 8.27                       | 12.12                   | 15.13                             | Kingston .....                | 2.63                  | 18.46                       | 20.27                   | 24.40                             |
| Kimba .....               | 0.72                  | 8.17                       | 9.13                    | *11.92                            | Robe .....                    | 3.25                  | 22.50                       | 20.77                   | 24.60                             |
| Kyanutta .....            | 0.78                  | —                          | —                       | 13.68                             | Beachport .....               | 3.12                  | 23.31                       | 22.96                   | 26.95                             |
| Minnipa .....             | 0.87                  | 7.65                       | 11.71                   | 14.68                             | Millicent .....               | 3.17                  | 23.88                       | 24.90                   | 29.70                             |
| Tumby .....               | 1.21                  | 8.72                       | 11.13                   | 14.22                             | Kalangadoo .....              | 4.06                  | 25.15                       | 26.02                   | 32.30                             |
|                           |                       |                            |                         |                                   | Mount Gambier .....           | 2.91                  | 17.90                       | 24.86                   | 30.82                             |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucula (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

| Branch.                          | Report on Page. | Dates of Meetings. |        | Branch.                         | Report on Page. | Dates of Meetings. |      |
|----------------------------------|-----------------|--------------------|--------|---------------------------------|-----------------|--------------------|------|
|                                  |                 | Oct.               | Nov.   |                                 |                 | Oct.               | Nov. |
| Alawoona .....                   | †               | —                  | —      | Eudunda .....                   | †               | 6                  | 3    |
| Aldinga .....                    | †               | —                  | —      | Eurella .....                   | 298             | 11                 | 8    |
| Allandale East .....             | †               | 3                  | 3 & 31 | Eurella Women's .....           | 298             | 1                  | 5    |
| Alma .....                       | †               | —                  | —      | Everard East .....              | 300             | —                  | —    |
| Amyton .....                     | †               | —                  | —      | Farrell's Flat .....            | †               | 31                 | 28   |
| Angaston .....                   | †               | —                  | —      | Finlias .....                   | †               | —                  | —    |
| Appila .....                     | 298             | —                  | —      | Gawler River .....              | †               | —                  | —    |
| Appila-Yarrowie .....            | †               | 3                  | 7      | Georgetown .....                | †               | 4                  | 1    |
| Arthurton .....                  | †               | —                  | —      | Geranium .....                  | †               | 25                 | 29   |
| Ashbourne .....                  | †               | —                  | —      | Gladstone .....                 | 300             | 3 & 31             | —    |
| Auburn .....                     | †               | —                  | —      | Gladstone Women's .....         | †               | 10                 | 14   |
| Auburn Women's .....             | †               | —                  | —      | Glencoe .....                   | †               | 14                 | 11   |
| Balaklava .....                  | †               | 27                 | 8      | Glossop .....                   | †               | —                  | —    |
| Balhamnah .....                  | 314             | —                  | —      | Goode .....                     | †               | 9                  | 6    |
| Barmra .....                     | †               | —                  | —      | Goode Women's .....             | †               | —                  | —    |
| Beetaloo Valley .....            | 300             | —                  | —      | Green Patch .....               | †               | 2                  | 6    |
| Belalie North .....              | 299             | 6                  | 3      | Guinane .....                   | †               | —                  | —    |
| Belalie Women's .....            | †               | —                  | —      | Gumeracha .....                 | 314             | 6                  | 3    |
| Berri .....                      | 309             | 8                  | 5      | Halidon .....                   | †               | —                  | —    |
| Big Swamp .....                  | †               | —                  | —      | Hanson .....                    | †               | —                  | —    |
| Blackheath .....                 | 314             | 9                  | 6      | Hartley .....                   | 314             | 1                  | 19   |
| Black Rock .....                 | 298             | 7                  | 4      | Hawker .....                    | †               | 7                  | 4    |
| Black Springs .....              | 302             | 7                  | 4      | Hookina .....                   | †               | —                  | —    |
| Blackwood .....                  | †               | 13                 | 10     | Hoyleton .....                  | †               | 20                 | 8    |
| Block E .....                    | 309             | —                  | —      | Inman Valley .....              | †               | 16                 | 20   |
| Blyth .....                      | 300             | 17                 | 21     | Ironbank .....                  | †               | —                  | —    |
| Boaleroo Centre .....            | †               | 3 & 31             | —      | Jamestown .....                 | †               | 27                 | 8    |
| Boolgun .....                    | 310             | 2                  | 6      | Kalangadoo Women's .....        | 297             | 11                 | 8    |
| Boora Plains and Thrington ..... | †               | —                  | —      | Kalangadoo .....                | †               | 14                 | 11   |
| Borrika .....                    | †               | —                  | —      | Kalyan .....                    | †               | 15                 | 19   |
| Bowhill .....                    | 310             | 6                  | 17     | Kangarilla .....                | 314             | —                  | —    |
| Brentwood .....                  | 307             | 2                  | 6      | Kangarilla Women's .....        | †               | 16                 | 20   |
| Brinkley .....                   | †               | 8                  | 5      | Kanmantoo .....                 | †               | —                  | —    |
| Brinkworth .....                 | 302             | 6                  | 3      | Kanni .....                     | †               | —                  | —    |
| Brownlow .....                   | †               | —                  | —      | Kapinnie .....                  | 308             | —                  | —    |
| Buchanan .....                   | 303             | —                  | —      | Kapunda .....                   | †               | 10                 | 14   |
| Bugle .....                      | †               | 14                 | 11     | Karcultaby .....                | †               | —                  | —    |
| Bundaleer Springs .....          | †               | —                  | —      | Karoonda .....                  | †               | 8                  | 5    |
| Bunora .....                     | †               | 8                  | 6      | Keith .....                     | †               | 2                  | 6    |
| Bute .....                       | †               | 16                 | 20     | Kelly .....                     | 308             | 4                  | 1    |
| Butler .....                     | †               | —                  | —      | Ki Ki .....                     | †               | —                  | —    |
| Calca .....                      | †               | —                  | —      | Kilkerran .....                 | †               | 2                  | 6    |
| Cadell .....                     | †               | —                  | —      | Kongorong .....                 | †               | 6                  | 3    |
| Caliph .....                     | †               | 7                  | 4      | Koolunga .....                  | 300             | 7                  | 11   |
| Canowie Belt .....               | †               | —                  | —      | Koonibba .....                  | †               | 2                  | 6    |
| Caralua .....                    | †               | 1                  | 5      | Koonunga .....                  | †               | 7                  | 4    |
| Carrow .....                     | †               | 8                  | 5      | Koppio .....                    | 308             | 6                  | 3    |
| Chandada .....                   | 308             | 17                 | 21     | Kringin .....                   | †               | 6                  | 3    |
| Charra .....                     | †               | —                  | —      | Kulkawilla .....                | 311             | 4                  | 8    |
| Cherry Gardens .....             | †               | 4 & 29             | —      | Kyancutta .....                 | †               | 7                  | 4    |
| Clanfield .....                  | †               | —                  | —      | Kybybolite .....                | 297             | 2                  | 6    |
| Clare .....                      | 303             | 7                  | 4      | Lameroo .....                   | 311             | 4                  | 5    |
| Clarendon .....                  | †               | 6                  | 3      | Langhorne's Creek .....         | †               | 1                  | 5    |
| Cleve .....                      | †               | 2                  | 6      | Laura .....                     | †               | 11                 | 8    |
| Cobdogla .....                   | †               | —                  | —      | Laura Bay .....                 | 308             | 14                 | 11   |
| Coille .....                     | †               | 1                  | 5      | Lenswood and Forest Range ..... | †               | —                  | —    |
| Coiton .....                     | †               | —                  | —      | Light's Pass .....              | †               | 6                  | 3    |
| Coomandook .....                 | †               | 31                 | 28     | Lipson .....                    | †               | 4                  | 1    |
| Coonalpyn .....                  | †               | —                  | —      | Lone Gum and Monash .....       | †               | 8                  | 5    |
| Coonawarra .....                 | 297             | 9                  | 6      | Lone Pine .....                 | †               | —                  | —    |
| Coorale .....                    | †               | —                  | —      | Longwood .....                  | 314             | —                  | —    |
| Copeville .....                  | †               | —                  | —      | Lowbank .....                   | †               | 8                  | 5    |
| Coulta .....                     | †               | —                  | —      | Loxton .....                    | †               | 10                 | 14   |
| Craddock .....                   | †               | —                  | —      | Lucindale .....                 | †               | —                  | —    |
| Cungena .....                    | †               | —                  | —      | Lyndoch .....                   | 304             | 7                  | 4    |
| Currency Creek .....             | 314             | 6                  | 3      | McLaren Flat .....              | 315             | 9                  | 6    |
| Cygnat River .....               | †               | —                  | —      | MacGillivray .....              | †               | 7                  | 4    |
| Darke's Peak .....               | †               | —                  | —      | Mallala .....                   | †               | 20                 | 17   |
| Dudley .....                     | †               | —                  | —      | Maltes .....                    | 308             | 2                  | 4    |
| Edmillie .....                   | †               | —                  | —      | Mangalo .....                   | †               | —                  | —    |
| Elbow Hill .....                 | †               | 14                 | 11     | Mannanarie .....                | †               | —                  | —    |



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| Branch.                    | Report on Page. | Dates of Meetings. |      | Branch.                     | Report on Page. | Dates of Meetings. |      |
|----------------------------|-----------------|--------------------|------|-----------------------------|-----------------|--------------------|------|
|                            |                 | Oct.               | Nov. |                             |                 | Oct.               | Nov. |
| Marama .....               | †               | —                  | —    | Roberts and Verran .....    | 308             | 1                  | 5    |
| Meadows .....              | †               | 8                  | 5    | Rockwood .....              | †               | 6                  | 3    |
| Meribah .....              | †               | 13                 | 10   | Rosedale .....              | †               | —                  | —    |
| Miling .....               | †               | 11                 | 8    | Roseworthy .....            | †               | —                  | —    |
| Milledilla .....           | †               | 9                  | 6    | Rosy Pine .....             | †               | 7                  | 4    |
| Millicent .....            | 297             | 31                 | 28   | Rudall .....                | †               | 10                 | 7    |
| Millicent Women's .....    | 297             | —                  | —    | Saddleworth .....           | †               | 7                  | 4    |
| Miltalie .....             | †               | 4                  | 1    | Saddleworth Women's .....   | 306             | 7                  | 4    |
| Mindarie .....             | †               | 3                  | 7    | Salisbury .....             | †               | 14                 | 11   |
| Mimipa .....               | †               | —                  | —    | Salt Creek .....            | †               | —                  | —    |
| Modbury .....              | 304             | —                  | —    | Sandalwood .....            | †               | —                  | —    |
| Monarto South .....        | 312             | —                  | —    | Scott's Bottom .....        | 315             | 4                  | 1    |
| Moonta .....               | †               | —                  | —    | Shoal Bay .....             | 315             | 7                  | 4    |
| Moorlands .....            | 312             | 8                  | 5    | Smoky Bay .....             | 308             | 11                 | 1    |
| Mooreook .....             | †               | —                  | —    | Snowtown .....              | †               | 10                 | 14   |
| Morehard .....             | 298             | 3 & 31             | —    | South Kilkerran .....       | 307             | 7                  | 4    |
| Morphett Vale .....        | †               | —                  | —    | Spalding .....              | †               | —                  | —    |
| Mount Barker .....         | †               | 8                  | 5    | Springton .....             | 315             | 1                  | 5    |
| Mount Bryan .....          | †               | —                  | —    | Stirling .....              | †               | —                  | —    |
| Mount Compass .....        | 315             | —                  | 6    | Stockport .....             | †               | —                  | —    |
| Mount Gambler .....        | †               | 10                 | 14   | Strathalbyn .....           | 315             | —                  | —    |
| Mount Hope .....           | †               | 7                  | 4    | Streaky Bay .....           | †               | 24                 | 26   |
| Mount Pleasant .....       | 315             | —                  | —    | Tallem Bend .....           | †               | 9                  | 13   |
| Mount Remarkable .....     | †               | —                  | —    | Talia .....                 | †               | 31                 | 28   |
| Mount Schank .....         | †               | —                  | —    | Tantanoola .....            | 298             | 4                  | 1    |
| Mudamuckla .....           | †               | 11                 | 8    | Taplan .....                | †               | 7                  | 4    |
| Mundalia .....             | †               | —                  | —    | Taragoro .....              | 300             | 2                  | 6    |
| Murray Bridge .....        | 312             | 15                 | 19   | Taracowie .....             | †               | 14                 | —    |
| Murraytown .....           | †               | 4                  | 1    | Tarlee .....                | †               | —                  | —    |
| Mypolonga .....            | †               | 22                 | 26   | Tatara .....                | 298             | 9                  | 6    |
| Myria .....                | †               | 8                  | 5    | Thrington .....             | †               | 26                 | 29   |
| Nantawarra .....           | 305             | 2                  | 6    | Tintinara .....             | †               | 13                 | 10   |
| Naracoorte .....           | †               | 11                 | 8    | Truro .....                 | 306             | 9                  | 6    |
| Narridy .....              | 300             | 2                  | 6    | Tulkinera .....             | 314             | 9                  | 6    |
| Narrung .....              | †               | —                  | —    | Tweedvale .....             | 315             | 9                  | 6    |
| Nelshaby .....             | †               | —                  | —    | Two Wells .....             | †               | 9                  | 13   |
| Nelshaby Women's .....     | †               | 2                  | 8    | Ungarra .....               | †               | 3                  | 6    |
| Netherton .....            | †               | 8                  | 19   | Upper Wakefield .....       | †               | —                  | —    |
| New Residence .....        | †               | —                  | —    | Uralda and Summertown ..... | †               | —                  | —    |
| North Booborowie .....     | 301             | 6                  | 3    | Velch .....                 | †               | —                  | —    |
| Nunilkompita .....         | †               | 2                  | 6    | Virginia .....              | †               | 10                 | 14   |
| Nunkeri .....              | †               | 1                  | 5    | Walkerie .....              | †               | 9                  | 12   |
| O'Loughlin .....           | †               | 13                 | 10   | Wallala .....               | †               | 22                 | 26   |
| Ororoo .....               | †               | —                  | —    | Wanbi .....                 | †               | 14                 | 11   |
| Overland Corner .....      | †               | 7                  | 4    | Wandearah .....             | †               | 4                  | 2    |
| Owen .....                 | †               | 3 & 31             | —    | Waracowie .....             | 299             | 7                  | 4    |
| Palable .....              | 308             | 3 & 31             | —    | Warrambo .....              | †               | 9                  | 13   |
| Parilla .....              | †               | —                  | —    | Wasleys .....               | †               | 2                  | 6    |
| Parilla Women's .....      | †               | 15                 | 19   | Watervale .....             | †               | 7                  | 4    |
| Parilla Well .....         | †               | 28                 | —    | Wauralte .....              | 307             | 13                 | 10   |
| Parilla Well Women's ..... | †               | 28                 | —    | Weavers .....               | †               | 6                  | 8    |
| Parrakie .....             | †               | —                  | —    | Wepowie .....               | †               | 14                 | —    |
| Parana .....               | †               | 3                  | 7    | White's River .....         | †               | —                  | —    |
| Paskeville .....           | 307             | 7                  | 4    | Whyte-Yaracowie .....       | †               | —                  | —    |
| Pata .....                 | †               | 3                  | 7    | Wilkawatt Women's .....     | 314             | 21                 | 18   |
| Penneshaw .....            | †               | —                  | —    | Williamstown Women's .....  | †               | 1                  | 5    |
| Penola .....               | 305             | 4                  | 1    | Williamstown .....          | †               | —                  | —    |
| Penwortham .....           | 307             | 2                  | 6    | Willowie .....              | 299             | 8                  | —    |
| Petersville .....          | †               | 7                  | 4    | Wilmington .....            | †               | 21                 | 18   |
| Petina .....               | †               | 25                 | 22   | Windsor .....               | †               | —                  | —    |
| Pimbong .....              | †               | 4                  | 1    | Wirrabara .....             | †               | —                  | —    |
| Pinkawillie .....          | 308             | —                  | —    | Wirrulla .....              | †               | 2                  | 6    |
| Pinnaroo .....             | 312             | —                  | —    | Wirrulla .....              | †               | 25                 | 22   |
| Pinnaroo Women's .....     | 312             | 3                  | 7    | Wolseley .....              | †               | 13                 | 10   |
| Poochera .....             | 308             | —                  | —    | Wudinna .....               | †               | —                  | —    |
| Port Elliot .....          | 315             | —                  | —    | Wynarka .....               | †               | —                  | —    |
| Pygery .....               | 308             | 4                  | 1    | Yacka .....                 | †               | —                  | —    |
| Quora .....                | †               | 8                  | 5    | Yadnarie .....              | 309             | 7                  | 4    |
| Ramco .....                | 312             | 6                  | 3    | Yallunda Flat .....         | 309             | —                  | —    |
| Rapid Bay .....            | †               | 9                  | 13   | Yandiah .....               | 300             | —                  | —    |
| Redhill .....              | 301             | —                  | —    | Yaninee .....               | †               | —                  | —    |
| Rendelsham .....           | 297             | 7                  | 4    | Yantanable .....            | †               | —                  | —    |
| Renmark .....              | †               | —                  | —    | Yeeleanna .....             | †               | 8                  | 5    |
| Rhyale .....               | †               | —                  | —    | Yorktown-Melville .....     | †               | —                  | —    |
| Richman's Creek .....      | †               | 2                  | 6    | Youngusband .....           | †               | —                  | —    |
| Riverton .....             | 305             | 18                 | 10   | Yurgo .....                 | †               | —                  | —    |
| Riverton Women's .....     | †               | —                  | —    |                             |                 |                    |      |

No report received during the month of September.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

##### COONAWARRA.

Mr. Alder presided over an attendance of 17 members at the meeting held on July 10th, when Mr. F. Darwent presented an excellent paper, "Cultivation." (Secretary, Mr. H. A. Lynden.)

##### KALANGADOO WOMEN'S (Average annual rainfall, 32.30in.).

Meeting held July 12th. Present: 16 members. Mrs. Dowdell gave a demonstration of rug making. (Secretary, Miss A. Kennedy.)

##### KYBYBOLITE (Average annual rainfall, 22in.).

Meeting held June 10th. Present: 20 members. Mr. Schinkel read a paper, "Manuring Pastures." Mr. D. Quinn also read a paper, "Orchard Pests." An excellent discussion followed the reading of each paper.

Twenty members and three visitors attended the meeting held on July 5th, when Mr. W. H. Downes (District Dairy Instructor) read a paper, "Pig Raising." (Secretary, Mr. F. H. Martin.)

##### MILLICENT (Average annual rainfall, 29.70in.).

June 27th.—Present: 10 members.

**POULTRY AS A SIDE LINE.**—Mr. K. Skeer read the following paper:—"Better chicks were raised from hens three years or older, but when the hens passed the third year they were not so profitable from an egg-producing point of view. Branding the eggs was a good thing, as it placed the responsibility for bad eggs on the right persons. Never set eggs of less than 2oz. in weight nor very large ones. Iodate of potash fed to breeding hens was said to ensure more reliable hatching. Eggs were preferred when no roosters were kept, and ensured a better price when they could be relied on as infertile. It was better to separate the sexes as soon as distinguishable, but there was not a very great demand for this class of poultry locally, and the city market was too far away. Barley was preferred by some as the best egg-producer in this cold climate. Where fowls were running out, two feeds per day were sufficient. As much grain as they would eat in 20 minutes was a simple means of finding out the quantity to feed to a flock. If it was not possible to link up with the Red Comb Association, if a number of persons went in for the business on approved lines, they could form an association of their own. Fifty fowls of the right ages and breeding would give better results than 100 nondescripts of uncertain age and type. (Secretary, Mr. E. Mitchell.)

##### MILLICENT WOMEN'S (Average annual rainfall, 29.70in.).

The inaugural meeting of the above Branch was held on June 20th and was attended by 13 members. Officers were elected.

Fifteen members were present at the meeting held on July 18th. Members discussed the subject, "Different Ways of Using in the Kitchen Surplus Piemelons, Pumpkins, and Marrows." Mrs. L. Oberlander tabled samples of pumpkin scones. (Secretary, Mrs. W. Varcoe.)

##### RENDELSHAM.

Meeting held July 19th. Present: 13 members and six visitors. During the afternoon Mr. H. Orchard (District Horticultural Instructor) gave a pruning demonstration in Mr. F. White's orchard, and in the evening read a paper, "Principles of Pruning." Trophies were presented to the winners of the Potato Competition—Messrs. S. Smith first, and W. Andrews second. (Secretary, Mr. F. R. White.)



**TANTANOOLA.**

Meeting held July 5th. Present: eight members and visitors. The annual report was presented and officers elected for the ensuing year. (Secretary, Mr. H. M. Kennedy.)

**TATIARA (Average annual rainfall, 19.39in.).**

The annual meeting of the Branch was held on July 9th, there being present 20 members and two visitors. The annual report was read and addresses were delivered by Messrs. E. S. Alcock and — Lyons. (Secretary, Mr. L. H. Butler, Bordertown.)

**UPPER-NORTH DISTRICT.****(PETERBOROUGH AND NORTHWARD.)****APPILLA (Average annual rainfall, 15.01in.).**

Mr. G. Wurst presided over an attendance of 12 members at the annual meeting which was held on July 4th. Messrs. G. Wurst and C. Borgas were presented with Life Membership Certificates of the Agricultural Bureau and officers were elected for the ensuing year. (Secretary, Mr. E. H. Wurst.)

**BLACK ROCK (Average annual rainfall, 12.57in.).**

Meeting held July 1st. Present: Nine members. The annual report was read, and officers elected. Mr. E. L. Orchard (District Agricultural Instructor) addressed the meeting. (Secretary, Mr. R. Kitto.)

**EURELIA (Average annual rainfall, 13.14in.).**

On the occasion of the Annual Meeting, which was held on July 9th and attended by 12 members and three visitors, officers were elected for the forthcoming year. Mr. E. L. Orchard (District Agricultural Instructor) delivered an address, "Maintenance of Soil Fertility." (Secretary, Mr. E. Wall.)

**EURELIA WOMEN'S (Average annual rainfall, 13.14in.).**

At the meeting held on July 9th the annual report was presented by the Secretary, Mrs. I. M. Wall. Officers were elected for the ensuing year. An address was delivered by Miss Campbell, of the Education Department. Twenty-four members and visitors attended.

**MORCHARD (Average annual rainfall, 13.50in.).**

July 4th.—Present: 11 members.

Mr. C. Halliday read a paper, "Grading Wheat."

**MANAGEMENT OF THE FARM FLOCK.**—The following paper was read by Mr. N. Lillecræpe:—"In dealing with this subject it is not my intention to lay down any hard and fast rules for managing a farm flock, as we all recognise that circumstances alter cases and conditions in Northern areas differ from those in the South. Most of the information and hints given in this paper have been gained from personal experience, and may be of use to others. Sheep are a very necessary adjunct to a farm, even though wool prices have fallen considerably they are still a very profitable sideline, and can also be utilised as labor savers in cleaning up fallows after shearing. The Merino is generally recognised as the most profitable sheep for a dry climate. Avoid old sheep if possible, particularly old wethers; they will not fatten, will not breed a lamb, and their wool is generally light and unprofitable. If you keep a permanent flock, cull the aged sheep every year. Also cull coarse, hairy woolled sheep. If there are not too many it is a good plan to kill them off for rations. Try and make the flock as even as possible, both in type and in wool. This will obviate the necessity for much classing at shearing time. Do not keep sheep in one paddock too long. Change the pasture often and they will do better, and you will be able to carry more sheep. They should always have access to water if possible. For raising fat lambs I recommend large-framed Merino ewes crossed with a Dorset ram. Procure two or four tooth rams if possible; the older rams become fat and lazy. The Dorset cross develops quickly, and at four months old should be ready for market. This lamb seems to stand the long rail journey better, does not waste or lose bloom like the pure Merino, and on account of weight and size realises a much better price. Get the lamb matured by August, if possible, as the price generally declines from then on as the number on the market increases. If you are unable to fatten crossbred lambs do not hold them if you can possibly sell, as they are an unprofitable line to keep for wool, and are usually bad



fencers. When shearing have everything in readiness before you start. Have the yards convenient, the shed, tables, press, bins, &c., clear, and see that there is plenty of shed room for penning sheep over night. Do not crowd them; the hot, steamy air of a close shed tends to raise the yolk and discolor the wool, especially if the wool is inclined to be yellow. I would not advise making more than two classes of small clip, but if the backs are inclined to be dirty, take them out and bale them separately. The dust from a few backs will permeate the whole bale when pressed, and reduce the value of the clip. Keep the best fleeces as uniform as possible and free from breaks. Brand these AA. The short, yellow, and heavy-conditioned fleece should be baled separately and branded A. Locks and stains should be dried before baling. Number and brand the bales neatly, and put the clip up as attractively as possible. Any member who reads his *Journal* should know how to put up his clip for market. Do not neglect to brand the sheep after shearing, unbranded sheep are difficult to trace. The owner of a registered brand is allowed to use any numeral from 2 to 9 as a flock mark, may earmark his sheep with any earmark he thinks proper, and may attach tags to the back of the ears of sheep. An earmark is handy to distinguish the sex of lambs when drafting or marking any particular line you wish to keep. When marking lambs in cold weather an antiseptic is not necessary, but in warm weather when flies are prevalent it is advisable to use Cooper's Milk Oil Fluid or thin medicated oil to protect the wound. Do not use Stockholm tar or any preparation that is liable to close up the wound too soon, this will cause blood poisoning. Sheep as a rule are fairly free from disease in a dry climate, except for "pink-eye." This generally causes total blindness for a time of one, and sometimes both, eyes. It is best to isolate the blind one if possible to prevent contagion. Treat the affected eye with boracic acid. The eye will usually respond to treatment if taken in time." (Secretary, Mr. A. McCallum.)

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**WARCOWIE** (Average annual rainfall, 12.16in.).

The Annual Meeting of the Branch was held on July 10th, and was attended by 10 members and visitors to the number of about 100. After formal business had been transacted Mr. E. L. Orchard (District Agricultural Instructor) delivered an address in which he gave an interesting description of the history of flour and bread making. The meeting then took the form of a concert and dance. Supper was provided by the ladies. (Secretary, Mr. A. F. Crossman.)

**WILLOWIE** (Average annual rainfall, 12.27in.).

The meeting of June 17th was held at the residence of Mr. A. Bartlett. A demonstration of pig killing and sheep dressing was given by Mr. E. Davis, who was assisted by Messrs. A. Crisp and S. Brooks. Afternoon tea was provided by the ladies. (Secretary, Mr. H. Crisp, Booleroo Whim.)

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## MIDDLE-NORTH DISTRICT.

### (PETERBOROUGH TO FARRELL'S FLAT.)

**BELALIE NORTH** (Average annual rainfall, 17.95in.).

July 7th.—Present: Nine members.

**SHARE FARMING.**—Mr. F. Carmichael read the following paper:—"Share farming has its advantages and disadvantages. There are different methods of share farming, namely, the half system and the third system. The landholder finds all the seed and super where the share farmer does not live on the property, but if the share farmer resides on the property it is customary to work the land on the half system. The share farmer finds half seed and super. With the half system an advantage is gained by a young man wanting to start out on his own. It is a good way of getting a start, as the young man will get a plant together, and get a footing before he buys a farm on his own account. Another advantage is that the landholder has not the responsibility of the upkeep of the plant, which is a heavy item at times. He would be able to run more sheep, and keep the fences in repair when not attending to the sheep. Another advantage is that the farmer with sons who has not sufficient land to keep them all at work, and is able to get share farming for his boys, can give the sons a start by that method, and an interest in the work on the farm. One of the disadvantages of share farming is where a farmer has sons going to school and lets his land on shares; this has a tendency to make the boys lose interest in the farm. Again, sometimes the share farmer does not work the land to the best advantage. For instance, they are not usually very fond of picking stones, and leave the stones from time to time, which makes the land very rough on implements. Share farming is a very good practice, for it relieves the landowner of worry of employing men and the upkeep of machinery, and it is a cheap and easy way for a young man to get plant and capital together for a farm of his own. (Secretary, Mr. E. Carmichael, Jamestown.)



**BEETALOO VALLEY** (Average annual rainfall, 23.50in.).

There was an attendance of ten members at the meeting held on June 9th. Discussion was devoted to making arrangements for the annual social. (Secretary, J. Halse.)

**BLYTH** (Average annual rainfall, 16.94in.).

Meeting held June 27th. Present: Mr. A. McEwin (Chair) and 18 members. Mr. E. Lanyon read a paper, "Will Power Farming Survive Low Yields and Reduced Prices for Wheat?" (Secretary, Mr. L. Mugge.)

**EVERARD EAST.**

Fourteen members attended the meeting held on July 9th. Mr. W. Johnston (District Agricultural Instructor) delivered an address, "Fertilisers." The meeting then took the form of a social evening. (Secretary, Mr. F. T. Hughes, Blyth.)

**GLADSTONE** (Average annual rainfall, 16.44in.).

Twenty-four members attended the annual meeting, which was held on July 11th. Officers were elected for the forthcoming year. (Secretary, Mr. F. Chick.)

**KOOLUNGA** (Average annual rainfall, 15.61in.).

Meeting held July 8th. Present: Mr. H. Spencer (Chair) and nine members. Mr. F. Pedler read an instructive paper, "Fallowing."

**NARRIDY** (Average annual rainfall, 15.99in.).

Meeting held June 21st. Present: 17 members. Mr. E. Richards contributed an instructive paper, "The Use of Increased Quantities of Super." Officers were elected.

**BACON CURING.**—The following paper was read by Mr. E. Klinger at the meeting on July 5th:—"The pig to be killed should be fasted at least for 24 hours to clean the system, but should have all the drinking water it requires. Care must be taken not to get the animal heated or excited, otherwise the flesh will be more difficult to cure and the bacon less palatable. I recommend shooting the pig. A .22 calibre rifle will answer the purpose, after which turn the pig on its back and stick it just in front of the breast-bone, driving the knife straight in and a little downward. When the knife is in, press the handle down a little to raise the edge of the blade, as to cut both jugular veins. Then turn the pig on its side to facilitate bleeding. The carcass should be ready for scalding a few minutes after killing. For scalding, I recommend a large vessel to dip and immerse the carcass. The water for scalding may be made up as follows:—For coarse-skinned or hairy pigs, three parts boiling water to one part of cold, and for young and tender-skinned pigs two parts boiling water to one of cold. For scraping, a saucepan lid or a blunt knife will answer the purpose. When the carcass is scraped clean, hang it up at a convenient height for disembowelling. To do this, make an incision from between the hind legs and continue right down to the lower jaw or chin, care being taken not to cut too deep, and thus puncture the intestines. To avoid this, place one hand in front of the intestines and guide the knife between the fingers. After cutting right down, start at the top, between the hind legs, and remove all the intestines and stomach, but before doing this, securely tie the end bowel. Next cut the diaphragm or lining between the stomach and lungs and take out the heart, lungs, windpipe, and tongue. This should leave the carcass clean and unsoiled. The head may be removed or left on as desired. The carcass should be left hanging in an airy place until next morning so that the flesh will set. In the morning, before sunrise if possible, cut the carcass straight down the backbone or cut down on both sides of the backbone. The latter method makes cutting up easier. When cutting up, first cut out the hams, then the shoulders. The sides or flitches are then trimmed by cutting off any surplus fat. The ribs can also be taken off, keeping as close to the bones as possible in order not to remove too much of the lean flesh. After trimming the hams and flitches they are ready for curing. This may be done in two ways: either by dry salting or pickling in brine. For dry salting, a little saltpetre should be rubbed into any veins and all bones. Then thoroughly rub salt into every part. This must be done every day for about a fortnight, more or less, according to the weight of the pig, always turning the meat and letting any moisture drain off. For brine pickling, the brine must be made up by putting enough salt into the water to float a fresh egg. Then boil and skim off any scum that may rise. When cold a little saltpetre and a few bay leaves are added, and a little sugar may also be added and the meat placed in a convenient vessel and the liquid poured over it. In the latter way the meat to be turned and left in the brine the same as in the first way. Always see that the meat is well drained before pickling, and keep it in a cool place while being cured. Hams will take longer to cure than bacon. After the meat is pickled, hang it up and thoroughly drain it. Then it is ready for smoking. To do this, hang it in a place where the smoke



can be confined. Place some coals on the floor and cover with sawdust or fine chips that will smoulder and send forth a good volume of smoke. If the sawdust or chips are too dry, dampen a little, otherwise it will burst into flame and cause the fat to melt and spoil the flavor. When the meat is a rich brown it will be smoked enough. After smoking place the cured meat in calico bags and hang in a cool, dark place." (Secretary, Mr. H. B. Cox.)

**NORTH BOOBOROWIE** (Average annual rainfall, 16.35in.).

Eight members and eight visitors attended the meeting held on June 9th, when Mr. E. L. Orchard (District Agricultural Instructor) delivered an address, "How to Increase Farm Production." (Secretary, Mr. H. Mudge, Willalo.)

**REDHILL** (Average annual rainfall, 17.02in.).

Meeting held July 8th. Present: Six members. Mr. J. Clothier read a selected paper, "Barley," and a keen discussion followed. The annual report and balance-sheet were presented, and officers elected. (Secretary, Mr. S. A. Pengilly.)

**YANDIAH.**

Meeting held June 20th. Present: 18 members and visitors. Mr. J. B. Harris (District Horticultural Instructor) gave an address, "Pruning and Planting Fruit Trees." (Secretary, Mr. F. Jettner.)

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**LOWER-NORTH DISTRICT.****(ADELAIDE TO FARRELL'S FLAT.)****BLACK SPRINGS.**

Mr. J. Heinrich presided at the annual meeting, which was held on July 8th, there being present 10 members and visitors. Mr. W. Johnston (District Agricultural Instructor) gave an address, "Farming Fallacies." (Secretary, Mr. K. H. Dunn.)

**BRINKWORTH (Average annual rainfall, 16.0in.).****July 7th.—Present: 20 members.**

**CONSERVATION OF FODDER.**—The following paper was read by Mr. C. Ottens:—"This subject generally receives careful consideration, and is never overlooked by careful farmers whose stock must have sustenance all the year round. During the past few years we have experienced adverse climatic conditions, when for many months there has been little or no feed from natural pastures. It is in these periods that the farmer realises the value of conserved fodder. The man farming around Brinkworth, and especially on the Condowie Plains, where little or no summer fodder grows, should pay the most attention to the quality and quantity of hay he proposes cutting. A man working a 700-acre farm with 12 horses should cut approximately 50 tons of hay per annum—harvest permitting—and in prosperous seasons stack aside a considerable surplus, to enable him to sustain his stock through lean times. A profitable reserve would be 100 tons of hay built in two stacks of 50 tons. Select good hay, wheaten hay in preference to oaten hay, on account of the latter being liable to be affected by mice. Cut the hay before the crop is too far advanced. Much value is lost by cutting too late, and avoid cutting rusty hay on account of the bad effect it has on horses, while nothing will be gained by cutting hay from wheat wherein smut is prevalent. Immediately the hay has been stacked it should be given a thick covering of straw to protect it against rain and sun. The most suitable corn fodder for horses, cows, and sheep is oats, barley for pigs, wheat for fowls, and peas are also a valuable foodstuff where it is possible to grow them. Every farmer should have at least two small paddocks of about 20 acres for the purpose of sowing oats and barley every alternate year; this would supply the average farmer with an annual supply of corn, and in most seasons could be fed off two or three times in its growing stage and still yield a profitable return. Oats and barley should be crushed before feeding, on account of a lot of the grains passing through the animals undigested. Should the corn crib become overstocked, there is a saying, "Turn barley into pork," and the same applies to oats; the grain can be boiled, and a farmer could fatten two or three times as many pigs without any extra milk supply. A thrifty farmer will also pay attention to the gathering of dry fodder, such as straw and cocky chaff. This backs up his hay supply, especially in dry seasons, and takes a very prominent part on the feeding chart at the present time, and has, no doubt, proved itself a boon to farmers in drought-stricken areas. A suitable sized straw stack, stacked in January and enclosed until about June, will provide stock with shelter, feed, and an occasional grooming during the winter months, and is well worth the energy spent erecting it. In wet seasons, when the straw is a fair length, it is advisable to cut sheaf straw. Straw mowed with a grass cutter and well stacked will keep 10 to 12 years, and be of better feeding value than when it was stacked; a stack of reserve straw in an odd corner will not be out of place on any farm. During the last two years there has been a great demand for cocky chaff as a fodder (when only five years ago its main use was for packing eggs). It is a good substitute for hay chaff, provided it is mixed with corn and molasses. Cocky chaff, if fed dry, is liable to cause stoppage in horses, a difficulty that has presented itself quite frequently of late, and in many cases has been the cause of a premature death to a valuable horse. Its chief value is as a standby in dry seasons, or for mixing with good, rich hay chaff. With the growing popularity of the reaper thresher, cocky chaff is losing a lot of its feeding value on account of the amount of straw these machines have in their chaff, while the stripper and harvester only leave chaff and flags of the straw, which, if carted before the first rain and conserved in an old shed in good repair, and shielded from the rain, will keep fresh and sweet for a much longer period than if it is stacked out in the open with only a straw covering to protect it. In this case, to obtain best results, it should be fed within nine months of when it was placed there. **Pasture Fodder.**—The only items worth noting are—to obtain best results, topdress pasture by broadcasting with 90lbs. super per acre, and avoid overstocking. On the average 600 to 700 acre farm, poor seasons or good seasons 150 acres of pasture would be the most payable position. In very wet periods, when the land is thoroughly sodden, it is advisable to keep animals, especially horses, off the pasture on account of the damage caused when they are tramping around.



A small area of lucerne is also a very valuable asset for summer green fodder, especially for milch cows. The only drawback it has in this district is that it cannot be grown successfully without irrigation, nevertheless, a patch a chain square could be attended to quite conveniently, and will provide two or three cuttings during a season. It is rather a striking fact that farmers in this district do not seem to take advantage of ensilage. Most farmers say it is too much trouble and expense, but it is not when it comes to be proved how much feeding value there is gained by it. Ensilage can be made from a crop soon after it is out in ear, or from self-sown feed, such as wild oats, having enough growth to be able to cut with a binder. It should be cut at the flowering stage, and chaffed and stored the same day, a job that will occupy three men. The first and most important point is erecting a silo. The underground is preferred, and should be erected near the chaffcutter. All that is required after the silage has been stored is a covering of boards, over which should be placed a layer of earth to prevent it being spoilt by atmospheric conditions. If preserved properly it will keep two or three years, and have a considerable advantage over self-sown hay. The chief feature of ensilage is as a fodder for dairy cows. It can also be fed to horses, and is invaluable to mares with foals at foot. Ewes with lambs will also take to it after a little coaxing. Ensilage proves its greatest value to the small farmer who only keeps a few cows as a sideline in the autumn and early winter before there is any greenfeed, but the farmer who does extensive dairying will find it a valuable foodstuff during the summer months." (Secretary, Mr. H. E. Ottens.)

#### BUCHANAN.

Meeting held July 4th. Present: 11 members. The meeting was devoted to making arrangements for the Annual Social. A report of the Wasley Conference was presented by the Secretary, Mr. L. V. Bell, Marrabel.

CLARE (Average annual rainfall, 24.67in.).

July 1st.—Present: 23 members.

**DAIRYING AND PIGS.**—Mr. R. Baker, R.D.A. (Lecturer in Dairying, Roseworthy Agricultural College), delivered an address, "Dairying in New South Wales." Replying to questions, Mr. Baker explained that to overcome the possibility of milk fever when the cows were fat, it was usual to decrease the feeding just before calving time and also to give a drench consisting of 1lb. Epsom salts, 1oz. ginger, 1lb. treacle. The lecturer, in answering a question *re* the best type of bacon pig, outlined the points essential for a good baconer, namely, long middle, deep ham, light shoulder and back, and not a heavy jowl. This type could be obtained fairly closely by crossing the Tamworth or Large York with the Berkshire. The Tamworth was more favored than the Large York, probably because the Large York was not so well-known, but that pig had made the bacon trade of Denmark. It was also recommended by some to make a second cross of either Berkshire, Tamworth, or Large White, back on the first cross. With regard to licks, it was mentioned that a large number of licks sold by numerous business houses contained a high percentage of common salt. It was explained that the main deficiency, particularly with cows was that of phosphate, not common salt. The following useful mixture was recommended for cows at the rate of 3ozs. or 4ozs. per day in their feed:—Bonemeal, 45lbs.; coarse salt, 40lbs.; Epsom salts, 5lbs.; iron sulphate, 5lbs. In connection with pigs, it was mentioned that the addition of bonemeal reduced the actual feeding by 20 per cent. to 25 per cent. The following mixture was recommended as being satisfactory for pigs:—Wood, ashes, or charcoal, 15lbs.; common salt, 20lbs.; bone-



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meal, 15lbs.; superphosphate, 15lbs.; iron sulphate, 4lbs.; Epsom salts, 4lbs.; baking soda, 6lbs.; sulphur, 6lbs. Potassium iodide could be added at the rate of 2ozs., but it was found not to be essential in the settled areas of South Australia. In the feeding of pigs with buck currants and raisins from the packing sheds, it was found that they acted as too much of a laxative. They could be used as 20 per cent. of the ration in conjunction with grain. Apples and pears had to be fed in great bulk to be of use to the pig. It took approximately 50lbs. of pears or apples to produce 1lb. of pork. It was also mentioned that it was more profitable to feed barley crushed and soaked for 12 hours only than whole and soaked. Skim milk and barley together were recommended as a good ration for pigs. (Secretary, Mr. A. Ninnes.)

#### LYNDOCH (Average annual rainfall, 23.70in.).

The annual meeting was held on July 10th and was attended by Mr. A. Springbett (Chair) and 18 members. The Secretary gave a resume of work performed by the Branch during the past year and officers were elected. (Secretary, Mr. J. S. Hammatt, Williamstown.)

#### MODBURY.

July 9th.—Present: 20 members and seven visitors.

**TOP DRESSING.**—Mr. W. Dalby read the following paper:—"In the early days of settlement in Australia, land not covered with forest or scrub was generally first-class grazing or pasture land. No wool was grown, no milk taken off, no mutton or beef, no horses, no grain, no wine or fruit, consequently all that grew was practically returned to the soil. Then came the white man requiring the production of fine white bread, wool for cloth, mutton and beef to eat, and leather to cover his feet, fruit and wine to tickle his palate, exports to cover imports. Consequently in a comparatively few years, land which once had been fertile ceased to produce equal to that of a decade earlier. No amount of resting or grazing of stock brought it back to its previous productiveness. In my boyhood days, resting land consisted of running as many sheep or cows thereon as it would keep for a year or two, and then another crop was sown with but scant success. Fallowing proved a great help; so great an influence has fallow on Australian productiveness that crops are seldom sown on any other than fallowed land to-day. Notwithstanding the cost of preparing land for cereal crops and the amount of labor expended, the crop would be poor, but for further expenditure in phosphate as fertiliser. Crops of 20bush. are now more or less common, and this represents the amount of phosphoric acid contained in 1cwt. of standard super. Thus the land has been improved slightly by any residue of phosphoric acid remaining after the crop has been removed, with corresponding improvement in grazing capabilities. This improvement led to experiment with super on purely grazing or pasture land with results quite as remarkable as its application to cereal crops. Without the aid of resowing, many of the best fodder plants, grasses, or clovers, thought to have been completely eaten out, reappeared and commenced to establish themselves and to add to the carrying capacity, and double that of virgin land. I have so improved the carrying capacity of grazing land by the application of 1cwt. of 45 super and 3lbs. of Subterranean clover as to keep healthy sheep where one poor delicate animal existed before, and this in a space of four years. And not only were the sheep healthy and strong, keeping in excellent condition, but the production of lambs increased 20 per cent., while deaths decreased from 10 per cent. to practically nil, or  $\frac{1}{2}$  per cent. in the last year for grown sheep, and other than the depredation of foxes, practically nil for lambs. For cattle, previous to top dressing, I used for cow and horse feed approximately 35 tons of hay annually at an average cost £2 10s. per ton. After the sowing of the Subterranean clover and 1cwt. of 45 super about seven tons of hay sufficed to feed both horses and cows. This left me with roughly 25 tons to 30 tons of hay to sell at £2 10s. per ton, or sufficient to pay for cost of super for top dressing purposes on the portion of land used for grazing only. Having by the aid of phosphate increased the grazing capacity of the land, care must be exercised that it does not lack other elements necessary, for in addition to super, three to five times the quantity of nitrates, nitrogen, and potash are absorbed, as well as that much iron and lime, &c. The application of iron in some lands is almost as necessary as phosphates and in others the application of lime. Should you at any time be in doubt and in need of advice, the Department of Agriculture is maintained to assist and will be glad to render advice or assistance. The general rise in land values compels greater production; less cost or higher prices and the financial cost and high taxation of land to-day compel something in the way of increased production."



**NANTAWARRA** (Average annual rainfall, 15.90in.).

Meeting held July 10th. Present: Mr. E. Hamdorf and nine members. An article, "The Principles of Vocational Guidance," was read by Mr. N. Robinson. (Secretary, Mr. N. T. B. Robinson.)

**PENWORTHAM.**

Meeting held July 10th. Present: 23 members and four visitors. Mr. A. R. Ninnes, of the Clare High School, gave an instructive address, "The Chemistry of Mixing Sprays," demonstrating with test tubes and glass containers the correct methods to adopt when preparing sprays. (Secretary, Mr. A. R. Jenner.)

**RIVERTON** (Average annual rainfall, 20.86in.).

The annual meeting was held on July 26th and was attended by Mr. D. Hannaford (Chair), 25 members, and 80 visitors. Life membership certificates of the Agricultural Bureau were presented to Messrs. J. Kelly, R. James, and T. Longbottom by the Hon. W. Hannaford. Prizes won in the 1929-30 Crop Competitions were also presented by Mr. Hannaford. Musical and vocal items were contributed. (Secretary, Mr. O. Longbottom.)

**SADDLEWORTH WOMEN'S** (Average annual rainfall, 19.65in.).

July 1st.—Present: 13 members.

**PUBLIC HEALTH.**—The meeting was held at the residence of Mrs. J. Frost. Mrs. Blundell read the following paper:—"During the past few years there has been a marked awakening throughout the world in matters of public health and the responsibility of Governments in this direction. The League of Nations has done a great deal to bring this about by internal exchange of ideas. The sphere of public health administration includes the effective carrying out of practices conducive to the health of the people, including measures of prevention which are the most important of all; also treatment of sickness and disease; the provision of hospital accommodation; the care and treatment of the blind, deaf, and dumb, and mental defectives; some measure of supervision and control in regard to town planning and housing; the encouragement of research work; the collection, preparation, and publication of statistics; and the training of persons for health services. In order to make State control effective, it is essential that there

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should be a Central Health Department, supported by the organised co-operation of the medical profession. The central department has primary responsibility for the administration of the Health Acts. It is also important that there should be close co-operation between the Health Department and other Government services in any way connected with health matters. Until recently, health legislation has dealt largely with the environments in which people live and the food which they eat. There is still room for much improvement on these lines. With regard to food, the exposure of meat to the public gaze and to the dust and pollution of a city atmosphere should be prohibited. Meat should be kept in the background and in fly-proof cases. Bread is frequently seen in vans, by no means dust-proof, handled by hands not always clean, and stowed away carelessly. Is it any wonder that germs of disease are conveyed to the people who eat it? It is interesting to note that the Housewives' Association is taking up these matters and insisting to some extent on the laws of public health being carried out. If every woman felt it her duty to destroy immediately all vegetable and other refuse from the house, we should find that the hot weather fly pest would be greatly diminished. It is all very well to shut flies out of the houses, but it is the extermination of this pest that we should have in view. This leads us to consider the environments in which people live. It is only natural that city dwellers should be more effectively protected by health laws than are the people who live in the country. In rural districts there is a crying need for reform in sanitary conveniences. The most primitive conditions are in vogue in most farm houses. A septic tank can be installed for about £30. With an average rainfall of 10in. and a catchment of 150 square feet sufficient water could be supplied to work it, yet farmers think nothing of spending many hundreds of pounds on motor cars, wireless sets, and other luxuries. It is simply that we have become accustomed to these insanitary and inconvenient conditions and we do not think about them. Surely, it is our duty as women to agitate for reform. There is also scope for extension and improvement in the important field of maternal and child welfare. Adequate provision should be made by the public health authorities for all maternity cases in properly equipped and efficiently staffed hospitals. These hospitals should be subsidised by the Government. There is still much preventable maternal mortality in this country. This again is a matter which women should take into their own hands. The care of the health and well-being of its children is the natural duty of any country. There is no more valuable public health work than the periodic medical examination of school children. This is a work that should be carried out without a thought of the cost. Its return to the community by the discovery and arrest of early cases of tuberculosis will alone repay whatever money may be expended for this purpose. The teaching of hygiene or the care of the body in schools is most important. We know that the fight against tuberculosis infection is coming sooner or later in the life of the child, and that he or she must depend on general resistance to a great extent to prevent establishment of this disease. The school child should therefore be taught as early as possible the value of hygiene, proper feeding, proper exercise, and the value of fresh air and cleanliness. The public health laws in New Zealand give the necessary authority for medical examination of children attending all primary schools. The school medical service aims at securing for each child three complete physical examinations during his school life. Special examinations are carried out where parents, teachers, or the school medical officers consider them necessary. Children found to be suffering from defects are kept under observation until the necessary treatment is obtained. It is recognised that medical treatment must be available for every child in need of it, and that adequate provision must be made for the ill-nourished and neglected. Mentally backward and feeble-minded children are given special consideration. In our cities much valuable service is rendered by the Child Welfare Centres, it is a pity that this good work cannot be extended into country districts. There is still a gap to be filled in the supervision of a child's health between infancy and school age. However watchful the parents may be, it sometimes takes a trained eye to detect the beginnings of disorder or disease. The public health authorities do much valuable service in checking epidemics of disease. All infectious cases must be notified at once, and it is the business of the health officers to see that all necessary precautions are taken with regard to disinfection of rooms, clothing, &c. I have now touched briefly on the fringe of this wide subject, and what I want to bring before you is the urgent need for reform in matters of public health in South Australia. Our Government is too busy settling its financial worries to trouble very much about these matters. If only more women would interest themselves in better housing conditions, the Pure Foods Act, and problems of maternal and child welfare, much of the present misery and unemployment might be avoided." (Secretary, Miss D. Partridge.)

TRURO (Average annual rainfall, 20.21in.).

Mr. W. Johnston (District Agricultural Instructor) delivered an address, "Crop Rotations," at the meeting held on July 14th, which was attended by 17 members and visitors. (Secretary, Mr. L. Davis.)



**YORKE PENINSULA DISTRICT.**

(TO BUTE.)

**BRENTWOOD** (Average annual rainfall, 15.67in.).

Meeting held June 5th. Present: 17 members and five visitors. Mr. R. Anderson read a paper, "An Outsiders' Views on Farm Life."

A further meeting was held on July 3rd, when a paper, "Fallowing," was contributed by Mr. G. Boundy. The trophies won in the Southern Yorke Peninsula Fallow Competition were presented to Messrs. J. Darby, first, and — Bartram, second. (Secretary, Mr. G. L. Tucker.)

**PASKEVILLE** (Average annual rainfall, 15.67in.).

Twelve members attended the meeting held on July 8th. Mr. L. Moar read a paper, "Side Lines to Better Farming," which aroused a good discussion. Officers were elected for the ensuing year. (Secretary, Mr. J. Prouse.)

**PETERSVILLE.**

Eighteen members and visitors attended the Annual Meeting, which was held on July 8th. Following the reading of the annual report and balance sheet by the Hon. Secretary, Mr. A. G. Dutschke, of Ardrossan, the election of officers took place. The meeting then took the form of a social and dance, interspersed with vocal and musical items.

**SOUTH KILKERRAN.**

Eleven members attended the meeting held on July 8th. The Annual Report was presented and officers elected for the forthcoming year. (Secretary, Mr. H. C. Schrapel.)

**WAURALTEE.**

Meeting held April 8th. Present: 15 members and four visitors. A paper, "Plant Life," was contributed by Mr. Lethbridge.

Meeting held May 6th. Present: 13 members and visitors. Mr. M. Newbold read a paper, "Preparations for Seeding," and a report of the Conference of Yorke Peninsula Branches was given by Mr. Lethbridge. Seventeen members attended the meeting held on June 3rd, when a paper, "The Agent's Position," was contributed by Mr. Huicks. (Secretary, Mr. M. Newbold.)

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**WESTERN DISTRICT.****CHANDADA.**

Mr. J. Carbery read a paper, "Fallowing," at the meeting held on June 20th, which was attended by 11 members. (Secretary, Mr. H. J. Chewings.)

**KAPINNIE.**

Meeting held June 27th. Present: 14 members. A paper, "Odd Jobs on the Farm," was contributed by Mr. S. Bulstrode. (Secretary, Mr. E. Wannan, Brimpton Lake.)

**KELLY (Average annual rainfall, 11.92in.).**

Meeting held June 14th at Mr. M. Martin's residence. A paper, "Holding the Young People on the Land," was contributed by Mr. J. Atkinson. (Secretary, Mr. W. Martin, Kimba.)

**KOPPIO (Average annual rainfall, 22.40in.).**

Mr. V. Gardner presided over an attendance of 12 members and three visitors at the meeting held at Mr. M. Gardner's residence on May 19th. Addresses were delivered by Messrs Orchard and Adams, of the Department of Agriculture. A Life Membership Certificate of the Agricultural Bureau was presented to Mr. H. Thompson. (Secretary, Mr. W. T. Gardner, White's Flat.)

**LAURA BAY.**

Mr. E. Barnett presided over an attendance of 17 members and visitors. Addresses were delivered by Messrs. W. J. Spafford and W. H. Brownrigg, of the Department of Agriculture. The meeting was held at the residence of Mr. W. Bewell on July 4th. (Secretary, Mr. W. Edson, Ceduna.)

**MALTEE.**

The annual meeting of the Branch was held on August 7th. There was a good attendance of members and delegates. The annual report was read and officers elected. (Secretary, Mr. E. Schwarz.)

**PALABIE.**

Meeting held July 9th at the residence of Mr. Rashleigh. Present: 13 members and four visitors. This was the inaugural meeting of the Branch, and the Secretary, Mr. E. H. Rasleigh, of Wudinna, read extracts from the Departmental Bulletin, "Handbook for Secretaries of the Agricultural Bureau."

**PINKAWILLINIE.**

The meeting of June 14th was held at the residence of Mr. S. Johnson, and was attended by 19 members and several visitors. The meeting took the form of a debate on the subject, "The Compulsory Pool v. The Open Market for Wheat." The team debating the claims of the open market were judged the winners. Supper was provided by the ladies. (Secretary, Mr. S. C. Johnson.)

**POOCHERA.**

The Annual Meeting was held on June 18th, and was attended by nine members. The annual report was presented and officers elected. Trophies won in the last year's wheat crop competition were presented to Messrs. G. Bockelburg and T. and J. McCormack. It was decided to place on record the services rendered to the Branch by Mr. Bohlin. (Secretary, Mr. F. R. Joy.)

**PYGERY.**

Meeting held July 8th. Present: 20 members. Mr. E. Edmonds read a paper, "The Cost of Production." (Secretary, Mr. A. Day.)

**ROBERTS AND VERRAN.**

Mr. G. Gordon presided over an attendance of 13 members and visitors at the meeting held on July 9th. An instructive paper, "Fodder Conservation," was contributed by Mr. M. Masters. (Secretary, Mr. O. M. Masters, Verran.)

**SMOKY BAY (Average annual rainfall, 10.61in.).**

The Hon. Secretary, Mr. K. Harrison, read a report showing the work performed by the Branch during the past year at the Annual Meeting, which was held on July 5th. Officers were elected and a programme of meetings arranged.



**TARAGORO.**

Eleven members attended the meeting held on July 10th, when an interesting paper, "Following," was read by Mr. C. Hoffrichter. (Secretary, Mr. T. Winters, Cleve.)

**YADNABIE** (Average annual rainfall, 14.09in.).

Meeting held July 8th. Present: eight members. An instructive paper, "Fences," was read by Mr. E. Spriggs. (Secretary, Mr. C. J. Deer, Cleve.)

**YALLUNDA** (Average annual rainfall, 18in. to 19in.).

Meeting held June 10th. Present: 10 members. Mr. H. D. Adams (District Agricultural Instructor) delivered an address, "Working the Soil." (Secretary, Mr. R. P. Cabot, Yallunda Flat.)

**EASTERN DISTRICT.****(EAST OF MOUNT LOFTY RANGES.)****BERRI.**

Twenty members and ten visitors attended the Annual Meeting, which was held on July 7th. The annual report was presented, and officers elected. In appreciation of the valuable work performed in the interests of the Branch, Mr. W. R. Lewis, who has held the office of Secretary for 18 years, was presented with two upholstered chairs. (Secretary, Mr. R. Johnson.)

**BLOCK E.**

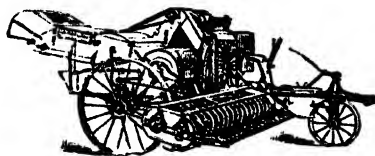
July 7th.

**ANNUAL PRUNING COMPETITIONS.**—The Branch held its Annual Pruning Competitions on Monday, July 7th. The tree pruning was held on Mr. L. A. White's block. Only three competitors entered this section. The trees selected had been pruned by the same competitors last year. The judges were Messrs. P. John and C. Pappin Smith, who remarked that the tree pruning showed a marked improvement on last year's, and faults mainly were no provision made for re-furnishing in the peach, weakness of leaders in the pear,

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and overcrowding of fruit spurs in some instances in the apricot. The results in the trees were:—M. Pethick, first, 254 points; A. R. Nenke, second, 252 points; and H. B. Davis, 244 points. In the afternoon the vine competition was held on Mr. T. J. Hendrick's property, and was much better contested. The following are some of the judges's remarks:—Currants—Strong spurs cut too short, weak spurs left too long, too many three bud spurs, and spurs crowded. Sultanas—Number 1 cane (nearest to crown of vine) should go to bottom wire, and No. 2 to the top wire, this to keep fruit wood back to near the centre of vine; too many fractured cones; old wood not cleaned up; canes choked, bent too sharply on wire; water shoot and spurs underneath; too severe and too much saw; water shoot left in centre of vine; too many spurs and extended from frames; never leave spurs beyond canes. Gordos—Weak spurs too long, and spurs crowded; cut weak spurs back to one bud; too many spurs, and saw cuts too deep; three-bud spurs not wanted; saw cuts should be cleaned; too many base buds. The competitions were carried out under the new rules, which now include 10 points for time. The results of the vine section were:—M. Pietsch, 308 points; M. Pethick, 305½ points; A. R. Nenke, 291½ points; T. Hendrick, 289½ points; B. Jones, 281½ points; R. Falkner, 273½ points; H. Newstead, 263½ points; H. B. Davies, 259 points; W. Giles, 255½ points. (Secretary, Mr. H. B. Davies, Renmark.)

#### BOOLGUN.

July 10th.—Present: 17 members and two visitors.

SHEEP ON THE FARM.—Mr. A. McGowan read the following paper:—"The most suitable class of Merino sheep for the mallee is a medium or strong to medium wool sheep. The fine wool Merino has a tendency to weaken and go down on the back. The strong wool Merino is all right, except that its fleece is inclined to become harsh and dry in mallee country. The medium or strong to medium wool Merino, with careful breeding, will produce a profitable and attractive fleece. In most cases flocks are classed by taking out the fats for market. The best method to adopt for classing is on a commercial basis, or for age. Fat sheep in most cases carry better fleeces than out-of-condition sheep. Ewes with loose, open wool, light, and small fleeces of very greasy nature, small and aged ewes should be taken out. The drawing of the teeth of a broken-mouthed ewe while there is plenty of green feed about will improve the ewe and give her a longer life. Sheep must be kept on good feed to produce a good animal. Shortage of feed means a weedy sheep lacking in quality and type. (Secretary, Mr. J. Palin.)

#### BOWHILL (Average annual rainfall, 12in.).

July 7th.—Present: 27 members.

BENEFITS OF THE AGRICULTURAL BUREAU.—The following paper was read by Mr. G. Seidel:—"Benefits to be gained by farmers and all primary producers from activities connected with the Bureau can be classed directly and indirectly. We have an up-to-date Department of Agriculture in South Australia, and the South Australian farmer is not far behind in this respect, and the Bureau is described as the connecting link between the department and the farmer and producer generally, and is to-day recognised as being directly responsible for creating a wider interest among the producers to avail themselves of the result of the many experiments that have been tried out and proved a success. Without the advice of these experts, who have made a life study of the problems of production from the soil, farmers and producers would not be able to get such good results from the labor and capital put into the land. The Department of Agriculture in South Australia has connected with it experts in wheat and all cereal production; the dairyman has his expert; wool, fruitgrowing, poultry, all other livestock, and every line of activity in connection with agriculture. Any member of a Bureau who is confronted with a problem that he does not understand can get advice from these experts through the Bureau free of charge. This is indeed a privilege which is often passed over rather lightly. I have heard it said by some farmers that their practical experience over a period of 20 years or more should be sufficient and just as good as listening to a lecture by an agricultural instructor. Those same men are to-day using super and various recommended methods of pickling to prevent smut and sowing rust-resisting wheats. They do not seem to realise that it is only through scientific research and tests conducted over many years that has established the fact that by using super and selecting seed and handling it in the manner advised by these men who have successfully overcome any disability through conducting test after test that yields have increased and diseases at least partially wiped out. The average producer knows that he still has a lot to learn. He is constantly up against some problem, and although by practical experience he is certainly gaining knowledge there are many occasions when he is perplexed and will welcome expert advice. By becoming a live member of the Bureau he has the privilege of having valuable lectures by experts practically carried to him, and on other occasions when meeting with his fellow-producers we discuss each problem as it comes up, and many good ideas are exchanged



which must be beneficial to all concerned. Then he is in the privileged position to take an interest in the various crop competitions that are conducted in different districts throughout South Australia. The value of these competition cannot be over-estimated. They tend to increase average yields and create a rivalry which is beneficial, not only to those directly concerned, but to the whole of the producing community and the State. It has been proved that up-to-date working of fallow has made it possible to grow good crops on a low rainfall where before the improved method of working the fallow were put into operation the result was complete failure on the same rainfall. Fallow competitions are beneficial undoubtedly, and it is at meetings of the Bureau where these subjects are fully discussed. South Australia, in common with many other parts of the world, is passing through an economic depression, and many and varied are the reasons given for the present state of affairs. South Australia is dependent mainly on her primary production for her wealth. Then a discussion by members of an Agricultural Bureau on the economic situation is certainly not out of place. Such a discussion on what effect the universal use of the tractor on the farm in place of the horse has had on the general cost of production, whether it is an economically sound proposition to make money out of the South Australian soil and send it out of the country to pay for tractors and petrol. The primary producer is being looked to to-day to play a prominent part in levelling things up. I think he realises the position, and must study very closely his part in connection with the cost of production and the best way to distribute the results of his labor. This is a good subject for discussion. Then we have the pooling question, undoubtedly a very important one to the farmer. Advice to new members. It does not matter how old you are or how much experience you have had, you can keep on learning, sometimes from the young man who is a keen observer. To the younger members, do not be afraid to express an opinion on any subject. You will never succeed if you do not try. Remember that your Chairman and Secretary cannot make a thorough success of this Branch unless we all stick to the job. Some of the meetings will be a little slow. Then your job is to assist." (Secretary, Mr. M. Bæks.)

#### KULKAWIRRA.

July 15th.—Present: 12 members.

**SHEEP ON THE FARM.**—Mr. C. Robin read the following paper:—"For the purpose of this paper it will be assumed that shearing time is the end of the sheep year. When the flock has about a month's growth of wool the sheep should be dipped. Dipping not only destroys lice and tick, but acts as a check on the maggot trouble. Flockowners should also note that dipping is compulsory. A second dipping is seldom necessary in this district. During the spring months, blowflies are particularly active, and sheep which are unhealthy are liable to be struck. Lambs and hoggets also seem to be more liable to be struck than healthy grown sheep. The safest and most convenient preventive for lambs is to mix some arsenical sheep dip (about 10 times ordinary dipping strength), pour it into a shallow dish, and sit the lamb in it until the hindquarters are saturated. It is sometimes necessary to spray the whole flock. The best preventive against the maggot trouble is to keep the flock healthy, and to do this, divide up the pastures so that the sheep can be moved often. In new mallee country rubbishy herbage seems to predominate, and if a flock has a big area to wander over, the animals soon eat out the best nutritious plants and are gradually forced to eat the poorer herbage; this leads to digestive disorders and other troubles soon follow. Where new settlers have large areas of stubble on which they wish to run sheep, they will be able to keep a much larger flock if they made use of temporary fences for subdividing. To drill superphosphate and oats on the stubble is a sound payable proposition; also when rain falls in the autumn after a dry spell, it will pay to hand feed the flock with oats or chaff for two or three weeks until fresh green feed has got sufficient growth to feed the sheep. May is usually quoted as the proper month for lambing, but after the run of dry summers we have had for some time, I question whether it is the best for this district. April, May, and June have for some years past been our most difficult time for feed and our winters are not hard; also, if lambing comes after seeding, the flockowner can give more time to the flock. The flock should be visited every day during lambing. Young ewes are often touchy and will not let the young lambs suck, consequently they die of starvation. The flock needs a great deal more attention than most people seem to think, and to get good results takes time, labor, and some expense. (Secretary, Mr. H. Elliot, Karoonda.)

#### LAMEROO (Average annual rainfall, 16.33in.).

Mr. J. Koch presided over a good attendance at the meeting held on July 12th. The annual report and balance-sheet were presented, officers elected, and a programme arranged for the ensuing year. (Secretary, Mr. R. Koch.)



**MONARTO SOUTH** (Average annual rainfall, 14in. to 15in.).

Twenty-five members attended the meeting held on June 21st, when an interesting paper, "Careful Farm Management," was contributed by Mr. E. Zeunert. (Secretary, Mr. C. Altmann.)

**MOORLANDS** (Average annual rainfall, 14.76in.).

Meeting held May 14th. Present: 10 members and six visitors. Mr. P. H. Suter (Senior Dairy Instructor) delivered an address, "The Dairy Cow."

A further meeting, attended by eight members and visitors, was held on June 18th, and took the form of a "Question Box."

Meeting held July 9th. Present: 11 members and visitors. Mr. E. Herbert contributed a paper, "Handy Jobs on the Farm." (Secretary, Mr. L. Orloff.)

**MURRAY BRIDGE** (Average annual rainfall, 13.84in.).

Meeting held June 18th. Present: 14 members. Mr. E. Leishman (District Horticultural Instructor) gave an address, "The Care of the Orchard."

The meeting held on July 16th was attended by 14 members and visitors from the Brinkley Branch, who read the following papers:—"Increasing Farm Production," Mr. Pearson; "A Woman's Place on the Farm," Mr. Humphris; and "Government Experimental Farms," Mr. Rust. (Secretary, Mr. S. Jones.)

**PINNAROO** (Average annual rainfall, 14.94in.).

Meeting held May 21st. Present: 23 members and five visitors. Addresses were delivered by Messrs. W. C. Johnston and R. L. Griffiths, of the Department of Agriculture.

**PINNAROO WOMEN'S** (Average annual rainfall, 14.94in.).

Meeting held July 4th at Mrs. W. Davis' residence. A large number of members and visitors were present, when a Pruning Demonstration was given by Mr. E. Leishmann (District Horticultural Instructor). (Secretary, Mrs. F. Atze.)

**RAMCO.**

April 15th.—Present: Nine members.

**COWS AND PIGS AS AN ORCHARD SIDE LINE.**—Mr. J. Boehm read the following paper:—"Cows are a necessity on the orchard, especially where there are small children. If £10 to £12 is available for the purchase of a cow, select a good young animal. If a family of about six or seven buys milk and butter it would cost about 11s. or 12s. per week, so that in about five or six months the cow would be paid for. A good cow which gives 5galls. to 6galls. of milk a day pays for herself in a short time. A cow giving on an average of 3galls. per day would keep a family, as mentioned above, going for 10 months at least. The value of milk and butter for the 10 months would, at the present price, amount to £24. I have a cow which gave 8galls. of milk per day when first in milk, and after 22 months still gave 2galls. per day. People who object to the keeping of a cow on an orchard usually state that it is difficult to obtain food for the animal. Every orchard has the opportunity of growing lucerne, which is the best feed for a milking cow. In winter, cocky chaff with a little bran is a good and cheap form of fodder. In good seasons cocky chaff can be bought very cheaply. The cost of chaff and bran at 3s. 6d. per week are based on the keeping of my cow for 22 months—total for 22 months' feed, £8 8s.; cost of cow, £5; expenditure, £13 8s. Income for 22 months: value of milk, £50 16s.; value of cow, £18; total, £68 16s.; credit balance, £55 8s. With the separated milk pigs can be raised. Pigs are also very profitable. Twelve months ago I bought two small pigs at 12s. each. I kept them just 12 months and sold one at £5 5s.; the other I killed for home use. It weighed 240lbs., which at 6d. a pound amounts to £6. The pigs cost nothing to feed; all they received was milk and waste fruit, &c." Mr. C. Boehm agreed that such sidelines were profitable where there were people to attend to them, but when one had all the work to do, then it could not be done satisfactorily. After working all day, one could not do such work. If cows were kept, then certainly pigs were almost a necessity, but he considered they were too far away from a market. The writer had not allowed for labor; if that were added, then profits were not so great. Mr. R. Stanley said with children to help, cows and pigs were certainly a good sideline. A good cow kept in the yard and fed was a paying proposition and no trouble. He thought it might be profitable to buy a number of young pigs as suckers, put them into a Gordo vineyard, say one acre, and let the sucker do the picking. Would they not be worth more than Gordos at present?

A further meeting was held on May 12th, there being present seven members. Discussing the question, "Is it advisable to pull out Gordos to plant another variety?"

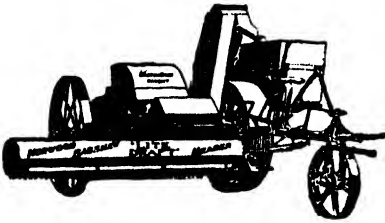


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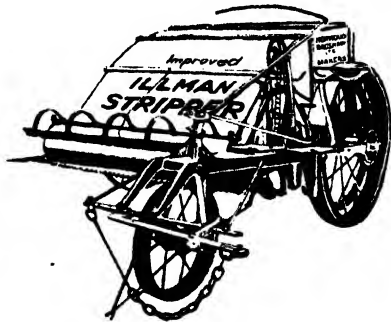


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Mr. F. Lewis said it was often stated that if vines did not produce 2 tons to the acre, root them out and plant lucerne; he did not agree with that. In his opinion Gordos at Ramco paid. "A plot of  $\frac{1}{2}$  acre of currants was not much good; they were going out, though apricots just above them were all right. A lot of chickweed grew amongst the vines. Is it advisable to pull out these currants and plant anything else?" It was suggested that lime might be tried on the ground or it might be advisable to plant trees, say apricots, as they seemed to do well. "Would sheep interfere with orange trees if shut in a grove?" One member said lambs would eat young shoots, but another had read an article advising the running of sheep, as they manured the soil and choked weeds. "Which is more profitable—to put 2 acres of high land into wheat and oats or Sudan grass?" Mr. Lewis said oats could be sown early and the Sudan grass in October.

#### TULKINEARA.

Meeting held July 17th at the residence of Mr. F. Vardon. Present: six members. Mr. P. H. Suter (Senior Dairy Instructor) addressed the meeting. (Secretary, Mr. F. Vardon.)

#### WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).

Meeting held July 15th. Present: 10 members and visitors. Mrs. J. Steer gave an interesting and instructive afternoon. She exhibited cakes, jellies, dried vegetables, and recipes for jam, and gave numerous labor-saving household hints. (Secretary, Mrs. A. Oram.)

### SOUTH AND HILLS DISTRICT.

#### BALHANNAH.

Meeting held July 11th. Present: 10 members. The Hon. Secretary (Mr. H. A. Spoehr) presented the annual report and balance-sheet, and officers were elected for the ensuing year.

#### BLACKHEATH.

Meeting held June 12th. Present: Seven members and visitors. A paper, "The Dietetic Value of Cereals," was read and discussed. (Secretary, Mr. E. H. Paech, Rockleigh.)

#### CURRENCY CREEK.

The meeting held on April 14th took the form of a "Question Box," and was attended by eight members.

Meeting held June 16th. Present: 14 members. A paper, "Varying Milk Tests," was contributed by Mr. D. Gordon.

The Secretary (Mr. D. J. Gordon) reports that there was an excellent attendance of members and visitors at the meeting held on May 15th, when Mr. W. J. Spafford (Deputy Director of Agriculture) delivered an address, "The Growing of Cereals."

#### GUMERACHA (Average annual rainfall, 33.54in.).

Meeting held July 7th at the residence of Mr. G. Randle. Present: 14 members. Mr. A. Garth gave an address, "Digestion." (Secretary, Mr. L. W. Wise.)

#### HARTLEY (Average annual rainfall, 15in. to 16in.).

Mr. W. Bermingham presided over an attendance of 15 members at the meeting held on June 11th. The following papers were read and discussed:—"Wheat Varieties," Mr. F. Wundersitz; "Peas as a Side Line," Mr. F. Pope.

Meeting held July 9th. Present: 14 members. The annual report was presented by the Secretary, Mr. H. Harvey.

#### KANGARILLA.

Meeting held July 11th. Present: 13 members and 16 visitors. Mr. A. H. Robin, B.V.Sc. (Government Veterinary Officer), delivered an address, "Ailments of the Dairy Cow." (Secretary, Mr. T. O. Golder.)

#### LONGWOOD (Average annual rainfall, 37in. to 38in.).

Meeting held July 5th at the residence of Mr. W. Nicholls. Present: Mr. W. Hughes (Chair) and 12 members. Members were given the opportunity of inspecting the Koolin Works. Afternoon tea was provided by Mrs. Nicholls. (Secretary, Mr. J. E. Coles.)



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McLAREN FLAT.

On June 19th a representative of the Vacuum Oil Company gave an address, illustrated with moving pictures, "Oil and its Products." There was a large attendance of members and visitors.

On June 21st the fourth Annual Juvenile Pruning Competition was held in Mr. J. Ingoldby's vineyard. Forty-eight competitors entered, the winners of the various sections being Masters J. Dowdell, W. Ward, T. Penny, D. Hunt, and C. E. Air.

The annual meeting was held on July 10th, there being present 20 members. The annual report and balance-sheet were presented, and officers elected for the ensuing year. (Secretary, Mr. A. Bruce.)

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## MOUNT COMPASS.

The Annual Meeting was held on June 3rd, and was attended by a large number of members and visitors. Mr. H. B. Barlow (Chief Dairy Instructor) delivered an address, "Bacterial Cultures in Milk." Officers were elected.

Mr. A. Kidman presided over an attendance of 28 members. Mr. Jefferies gave an address, "The Handling of Farm Stock." (Secretary, Mr. J. R. Black.)

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## MOUNT PLEASANT (Average annual rainfall, 27.38in.).

Meeting held June 13th. Present: Nine members. Mr. V. Tapscott read an instructive paper, "Fodder for Stock."

The annual meeting was held on July 11th, and was attended by eight members. A report of the year's work was presented and officers elected. (Secretary, Mr. D. Stow-Smith.)

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## PORT ELLIOT (Average annual rainfall, 20.05in.).

The annual meeting was held on July 19th, when there were present 18 members. The annual report and balance-sheet were presented and adopted. (Secretary, Mr. A. E. Lowe.)

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## SCOTT'S BOTTOM.

The meeting of July 5th was held at the residence of Mr. R. Thorpe, and was attended by 11 members. Several questions were submitted to be forwarded to the Department for a reply. Other matters of local interest were discussed. (Secretary, Mr. E. Atkinson, Cherry Gardens.)

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## SHOAL BAY.

Twelve members attended the Annual Meeting, which was held on July 8th. The Hon. Secretary (Mr. H. T. Bell, of Wisanger, Kangaroo Island) presented the annual report and balance sheet, and officers were elected.

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## SPRINGTOWN.

Mr. W. Roesler presided over an attendance of 15 members. Mr. L. Brownsea read an instructive paper on his experiences since his arrival in South Australia. (Secretary, Mr. E. Brokate.)

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## STRATHALBYN (Average annual rainfall, 19.22in.).

The annual meeting was held on July 8th. There was a very large attendance of members and visitors, including Mr. H. N. Wicks (Vice-Chairman of the Advisory Board of Agriculture), delegates from other Branches in the Southern District, and the Mayor of Strathalbyn (Mr. F. W. Elliott). Vocal and instrumental items were contributed, and the evening concluded with a supper provided by the ladies. (Secretary, Mr. F. W. Allison.)

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## TWEEDVALE (Average annual rainfall, 36.08in.).

Meeting held May 29th. A large number of members and visitors attended the meeting, when an illustrated address, "Motor Transport," was delivered by an official of the Royal Automobile Association.

On June 5th a lecture, illustrated with moving pictures, was delivered by a representative of the Vacuum Oil Company.

The Annual Meeting was held on June 10th. There was a large attendance of members and visitors, including delegates from neighboring Branches and Members for the District. Supper was provided by the ladies, after which a dance was held. (Secretary, Mr. A. B. Schapel.)



# CROWN LANDS.

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## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Secretary for Lands, Box 293A, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

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## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



# THE JOURNAL

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**All communications to be addressed:**

**to the Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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S. R. WHITFORD.  
*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### Feeding Values of Wheaten, Oaten, and Barley Hay.

In reply to a question submitted by the Snowtown Branch of the Agricultural Bureau, Mr. W. J. Spafford (Deputy Director of Agriculture) states that on analyses barley hay is a good deal better than either wheaten or oaten hay ton for ton, but the high proportion of beard carried by barley hay, makes it troublesome to farm livestock. Hays made from the three cereals when cut at flowering time, and when reduced to the same moisture content, can be compared as follows:—

| Hay.          | DIGESTIBLE NUTRIENTS. |          |      |                 |        |                    |
|---------------|-----------------------|----------|------|-----------------|--------|--------------------|
|               | Moisture.             | Protein. | Fat. | Carbo-hydrates. | Fibre. | Starch Equivalent. |
|               | %                     | %        | %    | %               | %      | %                  |
| Wheaten ..... | 10.0                  | 4.0      | 0.4  | 30.0            | 12.9   | 31.4               |
| Oaten .....   | 10.0                  | 5.3      | 1.6  | 25.4            | 18.2   | 32.5               |
| Barley .....  | 10.0                  | 4.3      | 0.9  | 34.7            | 18.3   | 42.8               |

The starch equivalent figures show that if no trouble was to be experienced from the strong beard on the barley hay about 3cwts. of barley hay would be equivalent to about 4cwts. of either wheaten or oaten hay. For anyone who is prepared to show the necessary attention to the inside of the mouths of animals to be fed upon it, barley hay can be recommended for farm livestock. It must be remembered when considering the growth of this hay that, although barley makes bulky crops, as a rule it "dries out" like. To reduce the trouble due to the presence of such a tough beard, barley should be at a greener stage than is usual for wheat or oats.

apli-

### Limestone Sawdust for Pastures.

Mr. W. J. Spafford (Deputy Director of Agriculture) states that in 1926 one of the plots in the Natural Pasture Improvement Experiments was dressed with 1 ton of Mount Gambier limestone sawdust per acre, and each year receives an application of 1cwt. superphosphate per acre. The results secured in comparison with other plots started at the same time are as follows:—

#### Grazing Results, Kybybolite, 1926-1929.

|                                                             | Sheep per Acre per Year. |       |       |       | Means. |
|-------------------------------------------------------------|--------------------------|-------|-------|-------|--------|
|                                                             | 1926.                    | 1927. | 1928. | 1929. |        |
| 1 ton Limestone Sawdust (1926), 1cwt. Super. annually ..... | 1.99                     | 1.86  | 2.54  | 2.52  | 2.23   |
| 1 ton Gypsum (1926), 1cwt. Super. annually .....            | 0.98                     | 1.50  | 2.08  | 1.95  | 1.63   |
| 180lbs. Super. annually .....                               | 1.27                     | 1.34  | 2.06  | 2.15  | 1.70   |
| No manure .....                                             | 0.99                     | 0.97  | 0.58  | 1.05  | 0.90   |

It will be noticed that there has been a marked beneficial effect on the grazing capacity of the pasture treated with the limestone sawdust against super alone, and against gypsum and super. If it is intended to use this sawdust as a top-dressing, it must be remembered that it does not replace superphosphate but should be used in conjunction with it.

### Storing Hams.

Mr. H. B. Barlow (Chief Dairy Instructor) has forwarded the following advice on the storing of hams to an inquirer at Mannum:—See that the hams are well dried out, otherwise mould is likely to develop. To keep hams for a lengthy period they require heavier salting. Dip the calico bags in a good creamy paste of whitewash, and immediately tie it round the hams. Prevent the wash from getting inside the bags, if possible.



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### **Sulphate of Ammonia v. Super for Barley for Greenfeed.**

The Deputy Director of Agriculture (Mr. W. J. Spafford) has informed the Farrell's Flat Branch of the Agricultural Bureau that under South Australian conditions no proper comparison can be made between the effects of dressings of superphosphate and sulphate of ammonia for barley crops, because our soils are so deficient in phosphorus that we must use a phosphatic manure to grow normal barley crops. In some locations a comparison could be made between the effects of using superphosphate alone and a mixture of superphosphate and sulphate of ammonia as, for instance, where intense culture is being practised and bare fallowing the land is not usual.

In such a case there is every chance that the mixture will give a better economic return of greenfeed than will superphosphate alone. On our ordinary farm land, however, the position is quite different, and in all probability superphosphate alone is the better of the two forms of manuring. A mixture of 1cwt. superphosphate (45 per cent.) and  $\frac{1}{2}$ cwt. sulphate of ammonia will cost about 12s., and this amount of money will purchase nearly 2 $\frac{1}{2}$ cwts. of superphosphate, and it is doubtful whether 12s. worth of the mixture would give greater returns in your district than superphosphate of the same value.

---

### **Blue Lupins.**

"Are New Zealand Blue Lupins fed to cows as fodders?" is a question recently submitted to Mr. W. J. Spafford (Deputy Director of Agriculture), who states that we do not know to which of the Blue Lupins the term New Zealand has been attached, but most of the Blue Lupins are only of value as a foodstuff for livestock after the seeds are ripe and have been "shot" on to the ground. Animals—and particularly sheep—pick up the fallen seeds and do well on them. The growing parts of the hairy blue lupins are disliked by farm animals, and, as a matter of fact, they will not touch the plants unless almost starving.

---

### **Control of Red Spider.**

"It is usual to treat crops affected by red spider with kerosine emulsion or tobacco wash in the winter, and with sulphur in the summer," is a reply given by Mr. W. J. Spafford (Deputy Director of Agriculture) to an inquiry from the Yeelana Branch of the Agricultural Bureau. Great care must be taken to make certain of spraying all parts of the plants, as the mites quickly breed up again if any are missed. The Department of Agriculture has published a leaflet by Mr. G. Quinn on "Common Pests and Diseases of Fruit Trees and Vines," in which will be found the formulae for making the spray mentioned.

---

### **Lucerne Growing.**

Replying to a correspondent at Black Hill, who sought information as to the best methods of establishing a plot of lucerne, the Deputy Director of Agriculture (Mr. W. J. Spafford) says in most parts of the State it pays to bare-fallow the land before seeding it to lucerne, because less trouble is experienced with weeds, but provided the land is reasonably free from weeds, this is not absolutely necessary. It is essential, however, that the soil preparation be very thorough, and the surface must be worked down to a fine tilth before seeding. Seeding should be done in April-May or September, and the seed must not be drilled in unless the soil is sufficiently moist to make certain of a good germination. The seed can be mixed with superphosphate, and be drilled in with an ordinary seed drill, remembering that the *seeding must be very shallow*, and the seed should not be mixed with the superphosphate for *more than four hours* before being drilled into the soil. If to be irrigated, 15lbs. to 20lbs. of seed per acre should be used, and 2cwts. of superphosphate can be put in at the same time. The first cut should be made as soon as the growth is high enough to be properly cut, and the mixture of lucerne



and weeds secured by this cut should be carted off the land. The sooner the first cut is taken the sooner will the lucerne crop control the weeds. The lucerne crop should be thoroughly cultivated each year in July or August, and receive an application of about 2cwt. superphosphate per acre at the same time.

---

### Soursobs.

“What means can be adopted to exterminate soursobs and magnesia patches which are increasing in area?” This question was received from the Talia Branch of the Agricultural Bureau. The following reply has been supplied by Mr. R. C. Scott (Supervisor of Experimental Work):—On account of their bulbing nature it is very difficult to exterminate soursobs over any area. By good cultivation and comparatively late seeding they can be kept in check so far as crops are concerned. Seeding should be delayed until this weed has germinated freely, and the land well tilled prior to drilling. On smaller areas it appears possible to destroy soursobs by spraying with solution of 100lbs. sodium chlorate to 100galls. of water to the acre, when the plants are in full bloom. As this is expensive it is impossible for farm lands, but is of value for gardens, &c.

A low annual rainfall and high summer temperatures are factors affecting the formation of salt of magnesia patches. The former is insufficient to wash out the soluble salts which accumulate in the upper soil layers as the moisture is evaporated in the summer months. In the first place, if the contour of the land permits, drains should be run through the affected patches leading to some natural watercourse in order that heavy rain may tend to drain away the salts dissolved. Secondly, anything which will shade the ground, thus checking evaporation, will reduce the accumulation of salt. An application of farmyard manure, straw, &c., is of assistance, but the object should be to make this protecting cover consist of a crop. In order to place the soil in the best possible condition for young plants to develop, it should be ploughed deeply late in the autumn and the furrow slice completely inverted so that the salt is buried and sweet soil left on the surface. The opening rains will tend to further sweeten the land and wash the salt deeper, thus improving the chance of a good germination of any seed planted. Late in the season a quick growing crop should be sown, of which barley is probably the most suitable, because of its earliness and resistance to salt. The straw should not be burned, but left to cover the soil. This practice should be continued again in the following year.

---

### Lambs for Export.

Replying to a question, “What would the live weight of a lamb be to dress 36lbs.?” which was asked by the Kangarilla Branch of the Agricultural Bureau, Mr. R. C. Scott (Supervisor of Experimental Work) says, as a general rule, a lamb dressing 36lbs. would have been approximately 72lbs. live weight. However, the shrinkage on dressing will vary from about 48 to 54 per cent., according to the type of lamb. A short-legged, thick-set type will lose the lesser amount, whilst the more it approaches the Merino type the greater will this loss be. Experiments conducted at Roseworthy College some years ago showed that pure-bred Merino lambs, averaging 73.30lbs. live weight, gave a mean dressed weight of 33.07lbs., or a shrinkage of 54.88 per cent. On the other hand, lambs from half-bred longwool ewes by Southdown rams, averaging 74.70lbs. live weight, yielded 37.94lbs. on dressing, or a loss of 49.22 per cent.

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### Blindness in Calves.

A correspondent at Gladstone reports that calves from six months up to nine months of age, in good condition, with plenty of good food and water available, suddenly became blind and within 24 hours died. This inquiry was submitted to Mr. C. McKenna,



B.V.Sc., M.R.C.V.S. (Government Veterinary Officer of the Stock and Brands Department), who says the type of blindness described in the calves has been fairly common during the past 16 months and has been reported from various parts of the State. The ages of the affected calves vary from one to nine months; the majority however, are two to four months. Usually the blindness develops gradually, and in every case both eyes are affected. They become glassy, have a staring appearance, and are a bottle-green color. No inflammatory changes have been observed. In some cases diarrhoea is present. Loss of condition is frequently observed. Some affected calves have fits or convulsions. Again, others hold their heads continually on one side or turn around in circles. From the observations made, we are inclined to think that the condition is due primarily to the lack of certain vitamin. This substance is usually obtained by the cow from green feed and passed on to the calf in the milk. It is not present in dry feed. For over the past two years the State has experienced poor seasons and long-continued dry periods. This has meant an absence of green feed in the ration over a long time (in one district this period was seven months). This has resulted in a deficiency of this particular vitamin. It is very probable that with a return to normal seasons this disease will become rare. Cases of affected calves having recovered their sight have not been reported, and treatment which has been tried has not been successful. Preventive measures advised are:—Firstly, the supplying of green feed to the cows during the dry periods of the year. Even in the dry areas a small area of green feed, especially lucerne, can usually be grown. Secondly, the feeding of cod liver oil to the calves. Cod liver oil contains the particular vitamin we have referred to. The following quantities are suggested:—1oz. up to the fourth week; 2ozs. up to the sixth week (1oz. equals two tablespoonfuls); 3ozs. up to the eighth week and over. The cod liver oil should be put in the bottom of the bucket and the skim milk gradually added whilst the mixture is kept stirred.

---

#### **Horse, Barb-wire Wound.**

Reporting that a horse had been injured with barb-wire and that the wound had become fly-blown, a correspondent at Wanbi sought information as to the best treatment to adopt to effect a cure. The inquiry was submitted to Mr. R. H. F. Macindoe, B.V.S., M.R.C.V.S., Deputy Chief Inspector of Stock, who states that maggots may be removed by injecting into the wound oil of turpentine, but it will not kill them. The following treatment is suggested:—Clip hair around the wound and wash with warm water and soap. Then inject a little oil of turpentine right into the bottom of the wound and search with a pair of forceps (made by bending a piece of hoop iron and filing it down to a size small enough to enter the wound) for maggots which may be deep-seated. Use the oil of turpentine two or three times a day until you are certain that all maggots are removed and then treat by injecting a lysol solution (one tablespoonful to a pint of water) twice a day and plug slightly with a small piece of cotton wool. If the wound is discharging, smear beneath the entrance to wound with vaseline.

---

#### **Dry and Wet Ploughing.**

The Millendilla Branch of the Agricultural Bureau submitted the following question:—“Is fallow ploughed dry and worked down when wet as good as if the ploughing was delayed until the time of giving the first cultivation to the dry ploughing?” Reply:—Provided that the “dry” ploughing is done early in the season, that is to say, before the heavy rains are finished, better results will be secured as against waiting for the soil to become wet before ploughing. The longer stirred land is exposed, the more plant food liberated, and if the ploughing is done in the autumn or winter enough rain can be expected to again consolidate the soil. (Reply by Mr. W. J. Spafford.)





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The following inquiry was received from Echunga:—"I have read about sodium chlorate killing ragwort in New Zealand; as I have a lot of blackberries, would sodium chlorate kill them?" Reply.—Our experience with treating blackberries with sodium chlorate is that it kills all of the above-ground growth, and only a few weak shoots are sent up from the old crowns, and that a second application destroys most of these. We have been using a 5 per cent. solution, i.e., 1lb. of sodium chlorate in 2galls. of water, which is sprayed on to the plants so as to wet all the growth. After seeing the results of our original experiments at Williamstown the owner of the property immediately ordered 1 ton of the material for the destruction of this pest. Sodium chlorate is obtainable from the Hardie Trading Pty., Ltd., Currie Street, and from the Oresco Fertilizers Ltd., North Terrace. (Reply by Mr. W. J. Spafford.)

**Take-All.**

"What is the cause of wheat drying off two months after seeding, which usually occurs in small patches, and the wheat grows to a height of several inches, and can be pulled out with ease, having no hold on the soil with the roots. Why does this occur more on good or early fallow than on ground not so well worked?" This question was also asked by the Millendilla Branch. Reply:—When young wheat plants which die can be readily pulled out of the ground the trouble is usually due to "take-all," the excessive looseness of the soil encouraging the disease. On the first appearance of the trouble the land should be heavily rolled, or be packed in some way, when the chances are that an immediate improvement will be noticeable. The latter part of the question cannot be answered without having seen the different blocks of land. (Reply by Mr. W. J. Spafford.)

**Lime for Clayey Soils.**

The Beetaloo Valley Branch of the Agricultural Bureau asks:—"What quantity of lime should be applied to land of a red clayey nature in this district?" Reply.—To improve the mechanical condition of the red clayey land of your district at least 10cwts. of lime per acre should be used, but almost equal results will be secured at a much less cost, and without being such an unpleasant job if the same amount of seed gypsum is applied. It must be remembered when applying either lime or gypsum that they should not be ploughed in, but should be spread on the surface after the land has been ploughed and cultivated, and only harrowed in. Seed gypsum can be drilled into the cultivated land, but lime and flour gypsum must be broadcasted, because so little will run through the seed-drill, and they are applied very irregularly by his machine. (Reply by Mr. W. J. Spafford.)

**Experiments in Fruit Setting of Apple.**

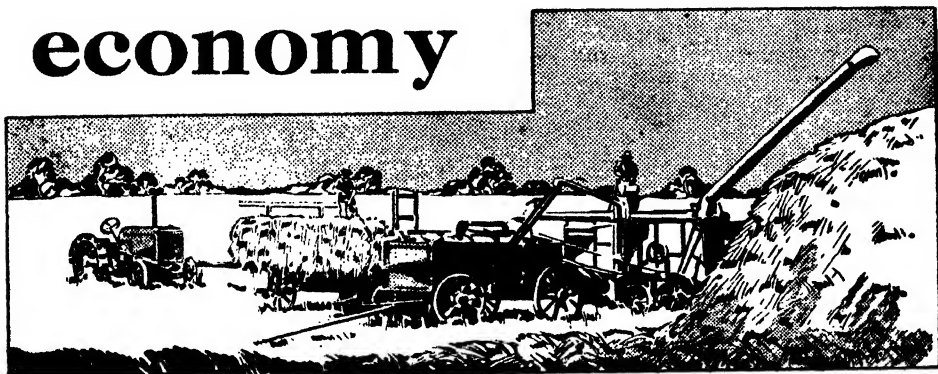
During the past two years experiments have been carried out in Otago by the Horticulture Division with the object of determining the treatment which would cause strong-growing Delicious apple trees on rich alluvial soil to set their fruit satisfactorily. Several series of tests—manurial and pruning—were carried out.

Reporting on the work, Mr. W. K. Dallas states that the treatment which gave the best results was a normal pruning, combined with the application of sulphate of potash at the rate of 2lbs. per tree in the month of August in each of the two years. The trees set a crop which averaged 14 loose petrol cases per tree, as compared with an average of five loose cases in the other plots. The pruning consisted of a judicious cutting out of leaders where it was considered that there were too many in the trees, with the object of allowing more sunlight into the centre. The lateral growth was thinned out, and the remaining laterals shortened back from 14in. to 18in. in length. —(From *New Zealand Journal of Agriculture*, August, 1930.)



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## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"E. H. H.," Wanbi, reports cow in milk 12 months, milk supply now falling off, low in condition.

Reply—You do not give any particulars as to what feed the cow has been getting, but in the absence of any symptoms indicative of disease, it is quite possible that being a heavy milker constantly over a long period, the ration is insufficient to keep her up in both milk production and condition, so that the former has been maintained at the expense of the latter. I would suggest that you feed her a bit more liberally, especially on concentrates, such as bran, oats, and linseed meal and see if any benefit results.

"F. E. C.," Balaklava, reports pony bad cough, coat very rough, urine thick.

Reply—The following treatment is suggested:—Stable pony and starve for 24 hours (allow water only). At the end of that period give the following drench:—Raw linseed oil, one pint; turpentine, four tablespoonfuls. Subsequently feed on good-quality chaff and bran and crushed oats and give a tablespoonful of Fowler's solution of arsenic mixed in a small damped feed night and morning for two weeks. During the period supply cut green barley daily.

"A. J. O.," Ceduna, has horse 13 years ago, off feed, signs of staggering after drinking and has swellings under belly.

Reply—Have the animal's teeth seen to if possible, and give the following drench:—Raw linseed oil, 1½ pints; turpentine, four tablespoonfuls, and repeat same in 10 days' time. Allow plenty of good green feed in the ration and supplement this with a little bran and good chaff. Give one tablespoonful of Fowler's solution of arsenic in the damped feed night and morning for a fortnight, and also have a supply of the following powders made up, each containing P. nux vomica, 1 dram; P. ferri sulph., 1 dram; P. radix gent., 1 dram. Give one powder night and morning half-hour after feeding. Mix the powder in a spoonful of molasses or honey to make a paste which can be smeared on the back teeth and tongue so that it will stick there and the animal will have to lick it down. The oedematous swelling under the belly should be well massaged regularly each day so as to break it up and assist its resorption. This will gradually take place as the animal regains its strength. Do not attempt to work the animal, but give it a spell.

"G. R. T.," Yurgo, has mare seven years old with large lump on shoulder.

Reply—The swelling should be treated by applying hot fomentations at frequent intervals. If any fluid can be detected as being present the swelling should be lanced at its lowest edge, so that these fluid contents can be evacuated. Subsequently, syringe the cavity out daily with weak antiseptic solution till the discharge stops and healing takes place. On no account should the animal be worked till the condition has cleaned up.

"H. W. C.," Mannum, asks cure for founder in young pigs.

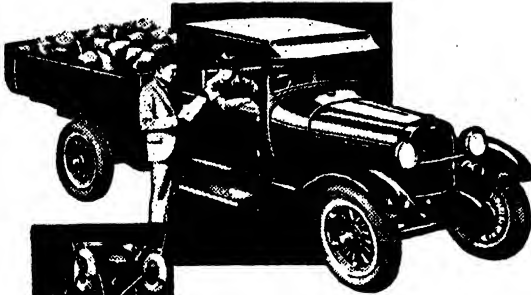
Reply—If the pigs are kept away from the mother while she is being fed on the grain, so that they are not able to get any of it, the condition will right itself in them in a few days' time. A dose of 1oz. Epsom salts per sucker given to them either as a drench or mixed in a little thin slop will help if given early in the attack.

"E. A. R.," Tarnma, has cow very hard to milk.

Reply—If you can obtain a better cow I would advise you to fatten up the hard milker for the butcher. The only treatment you could try would be to dilate the teat with a "teat dilator." You will have to obtain this instrument from one of the Adelaide firms. When using it see that it is clean (boil for 10 minutes) and paint the teat orifice with tincture iodine before inserting it.



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# NINTH ANNUAL REPORT OF THE TURRETFIELD DEMONSTRATION FARM (1929-30), INCLUDING DETAILED ANALYSIS OF MEAN FARMING COSTS (1921-30).

[By ARTHUR J. PERKINS, Director of Agriculture.]

## PART I.

### 1929-30 FINANCIAL TRANSACTIONS.

#### GENERAL SCHEME UNDER WHICH THE FARM HAS BEEN RUN.

The Turretfield Demonstration Farm has been run upon purely business lines since 1921, and it has therefore had to depend upon its own unaided revenue for nine successive seasons. In the latter connection, however, the Farm has been allowed overdraft rights up to £2,200, upon which 6 per cent. interest has been paid on monthly balances. On the other hand, in addition to interest on overdraft, the Farm has paid annually into the State Treasury the equivalent of rent on land and interest on original Floating Capital, less repayments of original loan which may have been made. During the seven initial seasons, the results of which have been regularly reported upon in the pages of the *Journal of Agriculture*, the Farm Accounts closed on a Net Profit Balance, aggregating £2,748 18s. 3d. for the seven years. For the first time in the history of the Farm, owing to unfavorable seasonal conditions, the 1928-29 season closed on a Debit Balance; and unfortunately, as will be seen later on, the continuance of unfavorable weather conditions, coupled with the fall in prices of Wheat and Wool, have led to similar results in the 1929-30 season.

#### SCOPE AND DIRECTION OF FARM OPERATIONS.

In the aggregate recorded area of the Farm—1,604 acres—are included 71 acres of quite useless river bed. The net available farming land is therefore represented by 1,533 acres, distributed as follows:—

|                                                  | Acres. | Percentage. |
|--------------------------------------------------|--------|-------------|
| Arable Land . . . . .                            | 1,266  | 82.6        |
| Non-arable grazing land (mostly hilly) . . . . . | 252    | 16.4        |
| Buildings, yards, plantations, &c. . . . .       | 15     | 1.0         |
| Total Available Farming Area . . . . .           | 1,533  | 100.0       |

Within recent years the main lines of exploitation have been Wheat and a Fat Lamb Flock of Sheep, although in the opening years Cereal Hay was the main crop grown. The gradual disappearance of the light horse had, however, rendered the growing of Hay for sale purposes more or less unprofitable, and Turretfield has, in consequence, been thrown back upon Wheat for grain, no more Hay being cut than has been required for home consumption. Towards this end, the Farm has been run on a three-course rotation, as follows:—

- (1) Bare Fallow,
- (2) Wheat, and
- (3) Grazing crops, usually Oats, and Natural pasture.

Portion of the land, however, has been treated on a two-course rotation, namely:—

- (1) Bare Fallow, and (2) Wheat; or
- (1) Pease, and (2) Wheat.



In the 1929-30 season, arable land received the following treatment:—

|                                   | Acres. |
|-----------------------------------|--------|
| 1. Bare Fallow . . . . .          | 471    |
| 2. Fallow Crop (Pease) . . . . .  | 44     |
| 3. Wheat and Cereal Hay . . . . . | 473    |
| 4. Grazing Crops . . . . .        | 177    |
| 5. Natural Pasture . . . . .      | 101    |

Total Arable Land . . . . . 1,266 acres

Originally, the attempt was made to associate a small Dairy Herd and an important Herd of Pigs with normal farm operations. Unfortunately, the inadequacy and costliness of hired labor for the purpose rendered these minor operations unprofitable, and they had to be abandoned. This was unfortunate, because on a farm on which the farmer and his family are mainly responsible for manual operations, these side lines count for much in the financial success of the farm. Should the prices of Wheat and Wool continue at existing low levels, we may possibly be driven back to our original plans.

#### 1929-30 SEASONAL CHARACTERISTICS.

Rainfall recorded at Turretfield in 1929 has been indicated in Table I. in comparison with corresponding figures for preceding 21 years:—

TABLE I.—*Contrasting 1929 Rainfall with Means of Preceding 21 Years.*

|                                          | 1929.          |                 | 1908-28 Means. |                 |
|------------------------------------------|----------------|-----------------|----------------|-----------------|
|                                          | Months.<br>In. | Periods.<br>In. | Months.<br>In. | Periods.<br>In. |
| <b>Late Summer and Autumn Rains—</b>     |                |                 |                |                 |
| January . . . . .                        | 0.34           |                 | 0.57           |                 |
| February . . . . .                       | 0.30           |                 | 0.81           |                 |
| March . . . . .                          | 0.15           |                 | 0.84           |                 |
|                                          |                | 0.79            |                | 2.22            |
| <b>Seeding Rains—</b>                    |                |                 |                |                 |
| April . . . . .                          | 0.60           |                 | 0.73           |                 |
| May . . . . .                            | 0.69           |                 | 2.58           |                 |
|                                          |                | 1.29            |                | 3.31            |
| <b>Winter Rains—</b>                     |                |                 |                |                 |
| June . . . . .                           | 2.13           |                 | 2.25           |                 |
| July . . . . .                           | 1.09           |                 | 2.03           |                 |
|                                          |                | 3.22            |                | 4.28            |
| <b>Spring Rains—</b>                     |                |                 |                |                 |
| August . . . . .                         | 1.61           |                 | 2.05           |                 |
| September . . . . .                      | 1.70           |                 | 2.37           |                 |
| October . . . . .                        | 0.79           |                 | 1.72           |                 |
|                                          |                | 4.10            |                | 6.14            |
| <b>Early Summer Rains—</b>               |                |                 |                |                 |
| November . . . . .                       | 1.42           |                 | 1.05           |                 |
|                                          |                | 1.42            |                | 1.05            |
| <b>Harvest Rains—</b>                    |                |                 |                |                 |
| December . . . . .                       | 2.62           |                 | 0.96           |                 |
|                                          |                | 2.62            |                | 0.96            |
| "Useful" Rain (April-November) . . . . . | 10.03          |                 | 14.78          |                 |
| Yearly Rainfall . . . . .                |                | 13.44           |                | 17.96           |

Table I. shows that in 1929 the total rainfall and its distribution over the growing period of Winter sown crops was even more unfavorable than in the immediately preceding season. The Total Yearly Rainfall—13.44in.—was 4½in., i.e., 25.2 per cent. below normal, and the "Useful" Rainfall—April-November—4½in., i.e., 32.1 per cent. below normal.



The late Summer and Autumn were exceptionally dry—1.43in., or 64.4 per cent. below normal—and succeeding Seeding Rains were altogether inadequate—61.0 per cent. below normal. Indeed, real seeding rain did not reach Turretfield until June. Winter and Spring rains were correspondingly short of requirements—24.8 per cent. and 33.2 per cent. respectively below normal.

November alone was above normal, and, unfortunately, of the 1.42in. recorded for this month, 0.85in., or 60.0 per cent., fell after the 20th of the month, i.e., too late to benefit standing Crops, but in ample time to damage harvest operations, which were further hampered by abnormally heavy December downpours.

Eventually, from 206.09 acres under Wheat we reaped 3,438.8bush., representing a mean yield per acre of 16.69bush. In this total, Wheat following Bare Fallow yielded 17.47bush. and Wheat following Pease 9.17bush. The mean 1921-29 Wheat yield at Turretfield has been represented by 18.83bush.

#### THE 1929-30 BALANCE-SHEET.

The 1929-30 Balance-sheet, copy of which accompanies this Statement, closed on a Debit Balance of £757 5s. This is attributable to two main causes, namely (a) the unfavorable character of the season, and (b) fall in prices of Wheat and Wool.

Credit Balances of the first seven seasons are shown below. Deduction therefrom of Debit Balances of the 1928-29 and 1929-30 seasons leaves accumulated Net Profits aggregating £1,461 1s.:—

|                                               | £      | s. | d. |
|-----------------------------------------------|--------|----|----|
| 1921-22 (nine months) . . . . .               | 398    | 11 | 6  |
| 1922-23 . . . . .                             | 483    | 15 | 9  |
| 1923-24 . . . . .                             | 216    | 5  | 11 |
| 1924-25 . . . . .                             | 1,173  | 15 | 10 |
| 1925-26 . . . . .                             | 79     | 5  | 2  |
| 1926-27 . . . . .                             | 101    | 1  | 7  |
| 1927-28 . . . . .                             | 296    | 2  | 6  |
| <hr/>                                         |        |    |    |
| 1921-28 Net Profits . . . . .                 | 2,748  | 18 | 3  |
| Less 1928-29 and 1929-30 Debit Balances . . . | 1,287  | 17 | 3  |
| <hr/>                                         |        |    |    |
| Accumulated 1921-30 Net Profits . . .         | £1,461 | 1  | 0  |

In these statements of Accounts, the accumulated Net Profits are assumed to represent the Turretfield Personal Capital, and losses occurring in any particular season are met from this Capital. The original Fixed and Floating Capital—£17,590 18s. 2d.—is treated as a Government Loan, and corresponding interest is paid yearly into the State Treasury. In 1925-26 this Loan was reduced by £1,000 from normal farm earnings. In addition, between July 1st, 1921, and April 1st, 1930, the sum of £7,612 5s. 7d., representing interest on Loan and Overdraft, has been paid into the State Treasury. It follows that over a period of 8½ years the Farm has cost the State nothing, whilst the Treasury has benefited to the extent of £8,612 5s. 7d.

#### INTEREST EARNED BY FARM ON CAPITAL ENGAGED.

If, from the standpoint of a farmer working the farm mainly on borrowed money, we look upon the funds engaged in the farm as being represented by the State original advances—£17,590 18s. 2d.—plus accumulated Net Profits, and less part repayment of Loan, then the rate of interest earned by the farm in each successive year has been shown in Table II.



TABLE II.—*Showing Interest per Annum Earned by Capital Engaged in Turretfield Demonstration Farm, 1921-30.*

|                     | Capital Engaged in Farm. |    |    |           |    |    | Farm Net Earnings.* |    |    |           |    |       | Interest<br>per Annum.<br>Earned.<br>% |
|---------------------|--------------------------|----|----|-----------|----|----|---------------------|----|----|-----------|----|-------|----------------------------------------|
|                     | Total.                   |    |    | Per Acre. |    |    | Total.              |    |    | Per Acre. |    |       |                                        |
|                     | £                        | s. | d. | £         | s. | d. | £                   | s. | d. | s.        | d. |       |                                        |
| 1921-22             | 17,590                   | 18 | 2  | 11        | 9  | 6  | 1,019               | 12 | 7  | 17        | 9  | 7.73  |                                        |
| 1922-23             | 17,989                   | 9  | 8  | 11        | 14 | 8  | 1,306               | 19 | 7  | 17        | 1  | 7.27  |                                        |
| 1923-24             | 18,473                   | 5  | 5  | 12        | 1  | 0  | 1,094               | 8  | 10 | 14        | 3  | 5.92  |                                        |
| 1924-25             | 18,689                   | 11 | 4  | 12        | 3  | 10 | 2,024               | 10 | 7  | 26        | 5  | 10.83 |                                        |
| 1925-26             | 18,863                   | 7  | 2  | 12        | 6  | 1  | 873                 | 8  | 0  | 11        | 5  | 4.63  |                                        |
| 1926-27             | 18,942                   | 12 | 4  | 12        | 7  | 2  | 922                 | 6  | 5  | 12        | 0  | 4.87  |                                        |
| 1927-28             | 19,043                   | 13 | 11 | 12        | 8  | 5  | 1,118               | 3  | 4  | 14        | 7  | 5.87  |                                        |
| 1928-29             | 19,339                   | 16 | 5  | 12        | 12 | 4  | 237                 | 16 | 9  | 3         | 1  | 1.23  |                                        |
| 1929-30             | 18,809                   | 4  | 2  | 12        | 5  | 5  | 8                   | 13 | 7  | 0         | 2  | 0.05  |                                        |
| Means of 8½ Seasons | 18,637                   | 19 | 10 | 12        | 3  | 2  | 983                 | 10 | 10 | 12        | 10 | 5.28  |                                        |

It will be observed that interest earned by the Farm on funds successively engaged over 8½ seasons has been represented by 5.28 per cent. This relatively low rate of interest is attributable chiefly to the unfavorable character of the past two seasons, coupled with falling prices for both Wheat and Wool.

The Mean Net Earnings of the farm—£983 10s. 10d.—which represent gross revenue, less costs apart from the equivalent of rental value plus interest on Capital, do not convey much to a farmer, who, together with his family, is usually mainly responsible for farm manual operations. In order to make the position clear it should be stated that in "costs" has been included a mean sum of £1,196 3s. 6d., representing cost of Management and Labor. If we add this sum to farm net earnings indicated above, we get £2,179 14s. 4d., representing the combined Net Earnings of the farmer, his family, and the Capital invested in the enterprise. Finally, if from these net earnings we deduct mean interest dues—£952 7s. 11d.—we would get £1,227 6s. 5d., which would represent the mean Labor Income of a farmer and family exclusively responsible for farm manual operations.

#### PROFIT AND LOSS ACCOUNT.

It has already been stated that the 1929-30 Season closed on a Debit Balance of £757 5s. Details concerning the Profit and Loss Account are shown below:—

#### Profit and Loss Account, 1929-30.

| DR.                       | £      | s. | d. | CR.                        | £      | s. | d. |
|---------------------------|--------|----|----|----------------------------|--------|----|----|
| To Sheep Account .. . . . | 764    | 7  | 8  | By- Farm Stores Account .. | 186    | 3  | 2  |
| Wheat Account .. . . .    | 2      | 9  | 8  | Poultry Account .. . . .   | 6      | 16 | 5  |
| Hay Account .. . . .      | 182    | 0  | 7  | Interest on Personal       |        |    |    |
| Cattle Account .. . . .   | 18     | 11 | 2  | Capital .. . . .           | 110    | 18 | 4  |
| Pease Account .. . . .    | 93     | 13 | 10 | Net Loss .. . . .          | 757    | 5  | 0  |
|                           |        |    |    |                            |        |    |    |
|                           | £1,061 | 2  | 11 |                            | £1,061 | 2  | 11 |

As has already been stated, 1929-30 losses are to be attributed chiefly to unfavorable seasonal conditions, coupled with falling prices in Wheat and Wool, and to this must be added decline in price of Sheep. The major loss was on our Fat Lamb Flock which, owing to weather conditions, had to be hand-fed over a great portion of the year. The Profit on Farm Stores was made mainly on the sale of last season's Wheat, which had been valued at 4s. 2d. on March 31st, but sold subsequently at 4s. 8½d., and on the sale of Hay, which had also risen in value.

\* Farm Net Earnings are taken here to represent gross farm revenue, less costs, but exclusive of rental value of land and interest on Capital.



## INTEREST ACCOUNT.

In the statements appearing in the second portion of this Report, interest charged against the various Real Accounts, from which inclusive costs of farming operations are determined, comes from two sources, namely:—

- (1) Interest on original Loan, less repayments, coupled with interest on overdraft, and
- (2) Interest on accumulated Net Profits, representing Turretfield Personal Capital.

The position of the Interest Account for the nine seasons under consideration is shown below in Table III.:—

TABLE III.—*Showing Interest Paid or Debited in Each Year (1921-30).*

|                          | Interest Paid<br>on Government<br>Loan and<br>Overdraft. |    |    | Interest on<br>Turretfield<br>Personal<br>Capital. |    |    | Total Interest<br>Debited<br>Against<br>Farm Accounts. |    |    |
|--------------------------|----------------------------------------------------------|----|----|----------------------------------------------------|----|----|--------------------------------------------------------|----|----|
|                          | £                                                        | s. | d. | £                                                  | s. | d. | £                                                      | s. | d. |
| 1921-22 (9 months) ..... | 659                                                      | 5  | 0  | —                                                  |    |    | 659                                                    | 5  | 0  |
| 1922-23 .....            | 874                                                      | 0  | 10 | 19                                                 | 18 | 7  | 893                                                    | 19 | 5  |
| 1923-24 .....            | 928                                                      | 16 | 7  | 44                                                 | 2  | 4  | 972                                                    | 18 | 11 |
| 1924-25 .....            | 901                                                      | 6  | 4  | 54                                                 | 18 | 8  | 956                                                    | 5  | 0  |
| 1925-26 .....            | 845                                                      | 0  | 3  | 113                                                | 12 | 5  | 958                                                    | 12 | 8  |
| 1926-27 .....            | 872                                                      | 1  | 7  | 117                                                | 11 | 8  | 989                                                    | 13 | 3  |
| 1927-28 .....            | 872                                                      | 16 | 4  | 122                                                | 12 | 9  | 995                                                    | 9  | 1  |
| 1928-29 .....            | 830                                                      | 13 | 0  | 137                                                | 8  | 11 | 968                                                    | 1  | 11 |
| 1929-30 .....            | 828                                                      | 5  | 8  | 110                                                | 18 | 4  | 939                                                    | 4  | 0  |
| Totals (1921-30) .....   | 7,612                                                    | 5  | 7  | 721                                                | 3  | 8  | 8,333                                                  | 9  | 3  |

## DEPRECIATION ACCOUNT.

In Table IV. below have been summarised data relating to amounts written off as depreciation since 1921:—

TABLE IV.—*Summarising Depreciation Deductions from Capital (1921-30).*

|                                                             | Buildings. |    |    | Fences. |    |    | Water<br>Service. |    |    | Tools and<br>Plant. |    |    | Total. |    |    |
|-------------------------------------------------------------|------------|----|----|---------|----|----|-------------------|----|----|---------------------|----|----|--------|----|----|
|                                                             | £          | s. | d. | £       | s. | d. | £                 | s. | d. | £                   | s. | d. | £      | s. | d. |
| Original 1921 valuation ...                                 | 2,388      | 10 | 0  | 990     | 0  | 0  | 79                | 10 | 0  | 724                 | 10 | 0  | 4,182  | 10 | 0  |
| Subsequent additions .....                                  | 392        | 6  | 3  | 384     | 14 | 2  | 164               | 16 | 1  | 1,708               | 0  | 0  | 2,649  | 16 | 6  |
| Totals .....                                                | 2,780      | 16 | 3  | 1,374   | 14 | 2  | 244               | 6  | 1  | 2,432               | 10 | 0  | 6,832  | 6  | 6  |
| Less sales and transfers ...                                | 8          | 1  | 9  | 88      | 12 | 9  | —                 |    |    | 35                  | 9  | 6  | 132    | 4  | 0  |
| Original values .....                                       | 2,772      | 14 | 6  | 1,286   | 1  | 5  | 244               | 6  | 1  | 2,397               | 0  | 6  | 6,700  | 2  | 6  |
| Less 1921-29 depreciation..                                 | 510        | 16 | 6  | 513     | 15 | 8  | 58                | 9  | 10 | 1,255               | 15 | 4  | 2,338  | 17 | 4  |
|                                                             | 2,261      | 18 | 0  | 772     | 5  | 9  | 185               | 16 | 3  | 1,141               | 5  | 2  | 4,361  | 5  | 2  |
| Less 1929-30 depreciation..                                 | 67         | 11 | 3  | 92      | 6  | 7  | 9                 | 4  | 1  | 109                 | 14 | 2  | 278    | 16 | 1  |
| 1930 valuation .....                                        | 2,194      | 6  | 9  | 679     | 19 | 2  | 176               | 12 | 2  | 1,031               | 11 | 0  | 4,082  | 9  | 1  |
| 1921-30 depreciation .....                                  | 578        | 7  | 9  | 606     | 2  | 3  | 67                | 13 | 11 | 1,365               | 9  | 6  | 2,617  | 13 | 5  |
| Percentage of capital assets,<br>plus additions, less sales | %          |    |    | %       |    |    | %                 |    |    | %                   |    |    | %      |    |    |
|                                                             | 20.9       |    |    | 47.1    |    |    | 27.7              |    |    | 57.0                |    |    | 39.1   |    |    |

Hence, between July 1st, 1921, and March 31st, 1930, the original capital value of Buildings, Fences, Water Service, and Tools and Plant—£4,182 10s.—has on the one hand been increased by additions to £6,832 6s. 6d., and on the other reduced by sales or transfers to £6,700 2s. 6d. Again, over the same period, these Capital items have been written down to the extent of £2,617 13s. 5d., or 39.1 per cent. of the original assets, plus additions, less sales. Finally, 1930 valuation has reduced the value of total Capital Assets to £4,082 9s. 1d.



## FARM STORES ACCOUNT.

In these statements, Farm Stores Account has been used as a convenience account to which all farm produce not immediately sold or used has been transferred pending sales or consumption. Produce transferred in this fashion has usually been charged up at current local rates, and it follows that profits or losses are incurred on individual items, at the time of sale or consumption, in proportion to market rises or falls.

The 1929-30 Stores Account closed on a Profit Balance of £186 3s. 2d., the respective Balances of preceding seasons are shown below:—

|                               | £    | s. | d. |
|-------------------------------|------|----|----|
| 1922-23 Profit of . . . . .   | 173  | 19 | 3  |
| 1923-24 Profit of . . . . .   | 74   | 11 | 3  |
| 1924-25 Loss of . . . . .     | 92   | 7  | 9  |
| 1925-26 Profit of . . . . .   | 364  | 10 | 1  |
| 1926-27 Loss of . . . . .     | 132  | 18 | 5  |
| 1927-28 Profit of . . . . .   | 394  | 18 | 4  |
| 1928-29 Loss of . . . . .     | 95   | 13 | 7  |
| 1929-30 Profit of . . . . .   | 186  | 3  | 2  |
| 1922-30 Mean Profit . . . . . | £109 | 2  | 10 |

The fact that over a period of eight years the Farm Stores Account has shown a mean yearly Profit of £109 2s. 10d. serves to show that Farm Produce has usually been transferred to this Account on a sufficiently conservative basis. The 1929-30 Profit Balance was attributable to accidental rises in Farm Produce as follows:—

|                               | £    | s. | d. |
|-------------------------------|------|----|----|
| Hay Sales . . . . .           | 105  | 11 | 5  |
| Wheat Sales . . . . .         | 77   | 0  | 8  |
| Oat Sales . . . . .           | 0    | 2  | 5  |
| Sundries . . . . .            | 3    | 8  | 8  |
| Total Stores Profit . . . . . | £186 | 3  | 2  |

# GRUBBING

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FOR STUMPS LARGE OR SMALL, GREEN OR DRY,  
SHORT OR HEAD-HIGH. THE ENORMOUS-POWER OF A  
**MONKEY GRUBBER**

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Removing the most stubborn obstacles cleanly, with most roots intact.  
Easy to handle, simple to operate, expeditious—its only need, regular oiling.  
The Standard equipment will clean up everything over 1½ acres from one anchorage.

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McPhersons Pty. Ltd., South Australian Farmers' Union.

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## HOUSE-KEEPING ACCOUNT.

The Farm has been responsible for the Board of the Manager, his family, and portion of the Farm Staff. In Table V. below, 1929-30 expenditure in this connection has been summarised in comparison with the means of preceding years:—

TABLE V.—*Summarising 1929-30 House-keeping Expenditure in Comparison with the Means of Preceding Years.*

|                               | 1929-30.<br>£ s. d. | 1922-29<br>Means.<br>£ s. d. | 1922-30 Means.    |                        |
|-------------------------------|---------------------|------------------------------|-------------------|------------------------|
|                               |                     |                              | Items.<br>£ s. d. | Per-<br>centages.<br>% |
| Labor .....                   | 89 8 0              | 83 14 6                      | 84 8 8            | 26.5                   |
| Provisions .....              | 94 11 2             | 106 12 1                     | 105 2 0           | 33.0                   |
| Farm produce .....            | 52 18 5             | 66 19 1                      | 65 3 11           | 20.5                   |
| Water .....                   | 2 14 6              | 3 12 10                      | 3 10 7            | 1.1                    |
| Kerosene .....                | 4 5 3               | 5 9 8                        | 5 6 8             | 1.7                    |
| Firewood .....                | 6 15 5              | 7 19 5                       | 7 16 5            | 2.5                    |
| Depreciation .....            | 39 4 9              | 47 16 3                      | 46 14 10          | 14.7                   |
| Totals .....                  | 289 17 6            | 322 3 10                     | 318 3 1           | 100.0                  |
| Mean number catered for ..... | 4.62                | 5.57                         | 5.45              |                        |
| Cost per Individual—          |                     |                              |                   |                        |
| Per day .....                 | 0 3 5               | 0 3 2                        | 0 3 2             |                        |
| Per week .....                | 1 4 1               | 1 2 2                        | 1 2 4             |                        |
| Per annum .....               | 62 15 10            | 57 15 3                      | 58 5 9            |                        |

Hence, over a period of eight years, mean inclusive costs of the Boarding House have been at the rates per individual of 3s. 2d. per day, or 22s. 4d. per week, or £58 5s. 9d. per annum.

## WAGES ACCOUNT.

Sums disbursed for Wages in 1929-30 aggregated £1,196 3s. 6d. I have shown below in Table VI. how these sums were distributed in comparison with means of preceding seasons:—

TABLE VI.—*Showing 1929-30 Distribution of Wages in Comparison with Preceding Means.*

|                                     | 1929-30.<br>£ s. d. | 1922-29<br>Means.<br>£ s. d. | 1922-30<br>Means.<br>£ s. d. | Per-<br>centage.<br>% |
|-------------------------------------|---------------------|------------------------------|------------------------------|-----------------------|
|                                     |                     |                              |                              |                       |
| General Expenses Account .....      | 196 16 2            | 243 19 0                     | 238 1 2                      | 19.9                  |
| Sheep Account .....                 | 163 2 10            | 143 2 5                      | 145 12 5                     | 12.2                  |
| Stores Account .....                | 141 16 4            | 115 13 3                     | 118 18 7                     | 10.0                  |
| Hay Account .....                   | 192 19 4            | 94 14 6                      | 107 0 1                      | 8.9                   |
| Fallows Account .....               | 109 8 0             | 94 1 2                       | 95 19 7                      | 8.0                   |
| Wheat Account .....                 | 55 9 8              | 98 19 8                      | 93 10 11                     | 7.8                   |
| Permanent Improvements Account ...  | 98 19 5             | 77 7 11                      | 80 1 10                      | 6.7                   |
| Working Horses Account .....        | 63 6 8              | 72 12 9                      | 71 9 6                       | 6.0                   |
| Pig Account .....                   | 4 19 0              | 67 10 6                      | 59 14 0                      | 5.0                   |
| Implements Account .....            | 54 1 11             | 57 11 3                      | 57 2 7                       | 4.8                   |
| Cattle Account .....                | 6 7 3               | 59 5 7                       | 52 13 4                      | 4.4                   |
| Barley Account .....                | —                   | 25 2 7                       | 21 19 9                      | 1.8                   |
| Garden Account .....                | 14 12 5             | 17 17 3                      | 17 9 2                       | 1.4                   |
| Pease Account .....                 | 13 15 11            | 11 7 2                       | 11 13 3                      | 1.0                   |
| Grazing Crops Account .....         | 14 4 3              | 7 16 5                       | 8 12 5                       | 0.7                   |
| Barley and Oats Account .....       | —                   | 9 8 6                        | 8 5 0                        | 0.7                   |
| Preparation of Stubble Land Account | 7 7 9               | 2 16 6                       | 3 7 11                       | 0.3                   |
| Poultry Account .....               | 0 8 3               | 2 18 8                       | 2 12 4                       | 0.2                   |
| Permanent Pastures Account .....    | 4 3 8               | 1 13 5                       | 1 19 8                       | 0.2                   |
| Totals .....                        | 1,141 18 10         | 1,203 18 6                   | 1,196 3 6                    | 100.0                 |







## PART II.

## DETAILED ANALYSIS OF FARMING COSTS.

## CAPITAL ACCOUNT.

It is obviously of importance to know what Capital outlay is involved in farming operations carried out on a farm of the Turretfield type. I propose therefore examining this question in detail in the light of operations extending over nine successive seasons.

It should be observed at the outset that at Turretfield the value of the Capital engaged has been successively represented by (1) original—1921—Government advances, covering value of Land, Improvements, Original Stock and Plant, &c., less such repayments as may have been made towards reduction of these advances, and (2) the value of purchases made since 1921, together with accumulated Net Profits, representing Turretfield Personal Capital.

Detailed analysis of the Capital Account on the 1st July, 1921 (original) and the 1st April, 1929, is shown below in Table VIII., together with corresponding mean figures for 1921-28 and 1921-29 periods respectively:—

TABLE VIII.—*Detailed Analysis of Capital Account, 1921-29.*

|                                   | Original Capital,<br>1/7/21. |    |    | Capital,<br>1/4/29. |    |    | Mean Capital,<br>1921-28. |    |    | Mean 1921-29 Capital. |    |    |           |    |           |       |
|-----------------------------------|------------------------------|----|----|---------------------|----|----|---------------------------|----|----|-----------------------|----|----|-----------|----|-----------|-------|
|                                   | £                            | s. | d. | £                   | s. | d. | £                         | s. | d. | Total.                |    |    | Per Acre. |    | Per Cent. |       |
| Land .....                        | 10,779                       | 0  | 0  | 10,946              | 7  | 1  | 10,838                    | 5  | 11 | 10,850                | 6  | 1  | 7         | 1  | 7         | 58.2  |
| Buildings, &c. ....               | 2,388                        | 10 | 0  | 2,232               | 11 | 11 | 2,274                     | 2  | 7  | 2,269                 | 10 | 3  | 1         | 9  | 7         | 12.2  |
| Water Service .....               | 79                           | 10 | 0  | 181                 | 9  | 3  | 135                       | 13 | 8  | 140                   | 15 | 4  | 0         | 1  | 11        | 0.8   |
| Fencing .....                     | 990                          | 0  | 0  | 715                 | 10 | 0  | 858                       | 14 | 9  | 842                   | 16 | 6  | 0         | 10 | 11        | 4.6   |
| Land and Improvements ..          | £14,237                      | 0  | 0  | 14,075              | 18 | 3  | 14,106                    | 16 | 11 | 14,103                | 8  | 2  | 9         | 4  | 0         | 75.7  |
| Tools and Plant .....             | 724                          | 10 | 0  | 1,112               | 15 | 7  | 1,214                     | 2  | 0  | 1,202                 | 16 | 10 | 0         | 15 | 9         | 6.4   |
| Working Horses .....              | 417                          | 0  | 0  | 378                 | 0  | 0  | 432                       | 0  | 4  | 426                   | 0  | 3  | 0         | 5  | 7         | 2.3   |
| Other Livestock .....             | 863                          | 3  | 6  | 1,230               | 15 | 0  | 1,178                     | 16 | 4  | 1,190                 | 2  | 11 | 0         | 15 | 6         | 6.4   |
| Produce on hand .....             | 580                          | 10 | 0  | 2,208               | 3  | 5  | 1,915                     | 7  | 4  | 1,947                 | 18 | 0  | **0       | 11 | 7         | 4.8   |
| Farm Fallows .....                | 330                          | 0  | 0  | 508                 | 18 | 2  | 504                       | 9  | 3  | 504                   | 19 | 2  | 0         | 6  | 7         | 2.7   |
| Sundries .....                    | 438                          | 14 | 8  | 215                 | 1  | 8  | 335                       | 3  | 8  | 321                   | 16 | 9  | 0         | 4  | 2         | 1.7   |
| Floating Capital .....            | £3,353                       | 18 | 2  | 5,703               | 13 | 10 | 5,579                     | 18 | 11 | 5,593                 | 13 | 11 | 2         | 19 | 2         | 24.3  |
| Total gross capital .....         | —                            | —  | —  | 19,779              | 12 | 1  | 19,686                    | 15 | 10 | 19,697                | 2  | 1  | —         | —  | —         | —     |
| * Less cash balance .....         | —                            | —  | —  | 970                 | 7  | 11 | 945                       | 4  | 0  | 948                   | 0  | 0  | —         | —  | —         | —     |
| Less repayment of principal ..... | —                            | —  | —  | —                   | —  | —  | 18,741                    | 11 | 10 | 18,749                | 2  | 1  | —         | —  | —         | —     |
|                                   | —                            | —  | —  | —                   | —  | —  | 125                       | 0  | 0  | 111                   | 2  | 3  | —         | —  | —         | —     |
| Total Net Capital .....           | £17,590                      | 18 | 2  | £18,809             | 4  | 2  | £18,616                   | 11 | 10 | £18,637               | 19 | 10 | £12       | 3  | 2         | 100.0 |

The various items included in the Mean Net Capital per acre—1921-29—admit of being grouped together under the following headings:—

|                                    | Value per Acre. |       | Percentage. |
|------------------------------------|-----------------|-------|-------------|
|                                    | £               | s. d. | %           |
| Land and improvements .. . . .     | 9               | 4 0   | 75.7        |
| Tools and Plant .. . . .           | 0               | 15 9  | 6.4         |
| Working Horses .. . . .            | 0               | 5 7   | 2.3         |
| Revenue Earning Livestock .. . . . | 0               | 15 6  | 6.4         |
| Farm Fallows .. . . .              | 0               | 6 7   | 2.7         |
| Sundries .. . . .                  | 0               | 15 9  | 6.5         |

Total Mean Net Capital .. . £12 3 2 100.0

It has already been shown that over a period of nine years the mean Net Earnings of the Farm have been at the rate of 12s. 10d. per acre, representing 5.28 per cent. of the mean Net Capital engaged. It follows therefore that on a Farm of this type,

\* "Cash Balance" stands for differences between debtors on the one hand, and creditors and overdraft balance, on the other.

\*\* Eleven shillings and seven pence per acre of produce on hand, or 4.8 per cent. of net capital does not correspond to the mean total of £1,947 18s. From the latter figure have been deducted £948 and £111 2s. 3d., representing respectively mean debtor cash balance and mean annual repayment of principal. This is legitimate since "Produce on hand" must necessarily vary within wide limits, according as available produce is sold before the 31st March in each year, or is reserved for future sale or use, and obviously when so reserved overdraft debtor balance is proportionately increased.



including 17 per cent. to 18 per cent. of non-arable grazing land, it is possible to realise reasonable profits from Wheat and Sheep, even after payment for Management and Labor at standard rates, and with Land and Improvements at £9 per acre and Farming Stock and Plant at £3.

Quite recently I have had occasion to analyse Capital invested in 129 Wheat Farms scattered all over the State\*; it will be of interest to compare the data collected with corresponding figures at Turretfield. In the summarised statement of Table IX., items representing "Farm Fallows" and "Sundries" have been omitted, because the value of "Farm Fallows" is always difficult to estimate on an average Farm and "Sundries" include chiefly unsold Produce, an exceedingly variable item from season to season.

TABLE IX.—*Comparing Capital Items at Turretfield with Corresponding Mean Values of 129 Typical South Australian Wheat Farms.*

|                                    | Turretfield.        |                     |                | Means of 129 Farms. |                     |                |
|------------------------------------|---------------------|---------------------|----------------|---------------------|---------------------|----------------|
|                                    | Per Farm.<br>Acres. | Per Acre.<br>Acres. | Per cent.<br>% | Per Farm.<br>Acres. | Per Acre.<br>Acres. | Per cent.<br>% |
| Total area .....                   | 1,533               | —                   | —              | 1,433               | —                   | —              |
| Area arable .....                  | 1,266               | 0.83                | 82.6           | 1,226               | 0.86                | 85.5           |
| Area cultivated ..                 | 976                 | 0.64                | 63.7           | 656                 | 0.46                | 45.7           |
| Area under crop ..                 | 556                 | 0.36                | 36.3           | 419                 | 0.29                | 29.2           |
| Area fallowed ...                  | 420                 | 0.28                | 27.4           | 237                 | 0.17                | 16.5           |
| Land .....                         | £ 10,850            | £ s. d. 7 1 7       | % 64.1         | £ 6,689             | £ s. d. 4 13 4      | % 59.7         |
| Permanent improve-<br>ments .....  | 3,253               | 2 2 5               | 19.3           | 2,408               | 1 13 7              | 21.5           |
| Farm Plant .....                   | 1,629               | 1 1 4               | 9.6            | 1,537               | 1 1 6               | 13.7           |
| Revenue-earning<br>Livestock ..... | 1,190               | 0 15 6              | 7.0            | 573                 | 0 7 11              | 5.1            |
| Total Capital ....                 | 16,922              | 11 0 10             | 100.0          | 11,207              | 7 16 4              | 100.0          |

From the above it will be seen that in the matter of Total area, and particularly in the matter of available arable area, Turretfield figures approach very closely the means of the 129 Farms examined. On the other hand, Turretfield is relatively a better improved Farm; 63.7 per cent. of its area is cultivated against a corresponding 45.7 per cent.; 36.3 per cent. is under crop against 29.2 per cent.; and 27.4 per cent. treated as bare fallow against 16.5 per cent. Similarly, permanent improvements at Turretfield are represented by £2 2s. 5d. per acre as against £1 13s. 7d., and revenue earning Livestock by 15s. 6d. per acre as against 7s. 11d. Finally, value of Farm Plant is almost identical in either case, namely, 21s. 4d. and 21s. 6d. per acre respectively.

In Table IX. the mean farm under consideration is assumed to represent freehold property having a value of £4 13s. 4d. per acre and involving £7 16s. 4d. of Capital investment. On the other hand, much of the recently settled land in South Australia is held as Crown Leases, under a covenant to purchase, which form of tenure involves the initial immobilisation of far less Capital. If, for instance, we assume our 1,433-acre farm to have been acquired originally at 15s. an acre, as an uncleared Mallee block, under a covenant to purchase agreement, yearly repayments of Principal and Interest would be represented by 60 half-yearly instalments of £2 16s. 5d. per £100 value. We may assume the land to have been completely cleared of scrub in the course of 10 years at the rate of £2 per acre. At the beginning of the eleventh year, Capital value invested in the land by the settler would have become £245 14s. 4d., representing instalment payments of Principal, plus £2,866 representing costs of clearing, or a total of £3,111 14s. 4d. On a per acre basis the settler's interest in the land would therefore be £2 3s. 5d., and assuming the value of other Capital items to remain the same, his

\* See *Journal of Agriculture*, April, 1930, page 772—"An Inquiry into present-day value of Capital invested in South Australian Wheat Farming, and its influence on current costs of production."



total Capital commitments in the eleventh year of occupancy of the block would be represented by £5 6s. 5d. per acre instead of £7 16s. 4d. of the freehold block, and interest charges to be debited against farming operations would be correspondingly lower.

#### INCLUSIVE YEARLY COSTS INVOLVED IN FARMING OPERATIONS.

Apart from the question of the original Capital essential to the acquirement and equipment of a farm, it is perhaps of equal importance to know the extent to which a farmer is likely to be involved in cash expenditure, or corresponding credit, in the yearly working of his farm. Towards this end I have summarised in Table X. mean inclusive costs per annum incurred at Turretfield during eight successive seasons:—

TABLE X.—*Summarising Turretfield Mean Yearly Inclusive Farming Costs (1922-30).*

|                                                      | Total. |    |    | Per Acre. |    |      | Per cent. |
|------------------------------------------------------|--------|----|----|-----------|----|------|-----------|
|                                                      | £      | s. | d. | £         | s. | d.   | %         |
| I. ITEMS INVOLVING CASH EXPENDITURE.                 |        |    |    |           |    |      |           |
| A. Capital Account.                                  |        |    |    |           |    |      |           |
| 1. Buildings and Improvements (£58 11s. 11d. wages)  | 102    | 17 | 0  | 0         | 1  | 4.1  | 2.4       |
| 2. Implements and tools (£1 11s. 11d. wages) . . . . | 133    | 5  | 11 | 0         | 1  | 8.9  | 3.2       |
| 3. Working Horses . . . . .                          | 29     | 16 | 7  | 0         | 0  | 4.7  | 0.7       |
| 4. Sheep and other Livestock . . . . .               | 388    | 10 | 8  | 0         | 5  | 0.8  | 9.1       |
| Totals . . . . .                                     | 654    | 10 | 2  | 0         | 8  | 6.5  | 15.4      |
| B. Current Yearly Expenditure—                       |        |    |    |           |    |      |           |
| 1. Wages and Workmen's Insurance . . . . .           | 902    | 4  | 0  | 0         | 11 | 9.2  | 21.1      |
| 2. Manures . . . . .                                 | 168    | 15 | 9  | 0         | 2  | 2.4  | 4.0       |
| 3. Repairs to Plant . . . . .                        | 77     | 16 | 4  | 0         | 1  | 0.2  | 1.8       |
| 4. Seed purchases . . . . .                          | 54     | 10 | 6  | 0         | 0  | 8.5  | 1.3       |
| 5. Livestock Foodstuffs Purchases . . . . .          | 33     | 3  | 3  | 0         | 0  | 5.2  | 0.8       |
| 6. Water Rates . . . . .                             | 28     | 8  | 2  | 0         | 0  | 4.5  | 0.7       |
| 7. Sundries . . . . .                                | 365    | 16 | 7  | 0         | 4  | 9.3  | 8.6       |
| 8. Rates and Taxes . . . . .                         | 53     | 12 | 10 | 0         | 0  | 8.4  | 1.2       |
| 9. Interest on Land and Improvements (Rent) . . .    | 711    | 17 | 0  | 0         | 9  | 3.4  | 16.7      |
| 10. Interest on Loan and Overdraft . . . . .         | 157    | 5  | 7  | 0         | 2  | 0.6  | 3.7       |
| Totals . . . . .                                     | 2,553  | 10 | 0  | 1         | 13 | 3.7  | 59.9      |
| Totals of Items involving Cash Expenditure . . . . . | 3,208  | 0  | 2  | 2         | 1  | 10.2 | 75.3      |
| II. ITEMS NOT INVOLVING CASH EXPENDITURE.            |        |    |    |           |    |      |           |
| 1. Farm Produce fed to Livestock . . . . .           | 664    | 0  | 6  | 0         | 8  | 7.9  | 15.6      |
| 2. Farm Produce used by Household . . . . .          | 67     | 11 | 9  | 0         | 0  | 10.6 | 1.6       |
| 3. Farm Grain used for Seed . . . . .                | 232    | 2  | 0  | 0         | 3  | 0.4  | 5.4       |
| 4. Interest on Personal Capital . . . . .            | 90     | 2  | 11 | 0         | 1  | 2.1  | 2.1       |
| Totals . . . . .                                     | 1,053  | 17 | 2  | 0         | 13 | 9.0  | 24.7      |
| Mean Yearly Inclusive Farming Costs . . . . .        | 4,261  | 17 | 4  | 2         | 15 | 7.2  | 100.0     |
| Add Mean Yearly Net Profit . . . . .                 | 79     | 3  | 5  | 0         | 1  | 0.4  |           |
| Mean Yearly Gross Farm Output . . . . .              | 4,341  | 0  | 9  | 2         | 16 | 7.6  |           |

Attention may be drawn to the following points in Table X.:—

1. Over eight consecutive seasons, inclusive farming costs at Turretfield have been at the mean rate of £4,261 17s. 4d. per annum, or 55s. 7d. per acre.
2. This mean expenditure has over the same period been balanced by a mean Farm Output of £4,341 0s. 9d. per annum, leaving a mean Net Profit of £79 3s. 5d.
3. Out of this mean inclusive expenditure of £4,261 17s. 4d., a sum of £3,208 0s. 2d., or 41s. 10d. per acre, had to be met by actual cash disbursements, whereas £1,053 17s. 2d. or 13s. 9d. per acre, represented book entries and transfers.



4. In this statement, Management and Labor have been assessed at £962 7s. 10d. To this sum should, however, be added £233 15s. 8d. representing value of provisions consumed by employees and of rent for cottages occupied by them, all of which forms integral part of costs of wages. Hence, the aggregate inclusive cost of Management and Wages has been £1,196 3s. 6d., or 15s. 7d. per acre, or again 28.1 per cent. of Total yearly expenditure. If now to the Mean Cost of Management and Wages—£1,196 3s. 6d.—we add the Mean Net Profit—£79 3s. 5d.—we shall get £1,275 6s. 11d., which would represent the Labor Income of a farmer and family mainly responsible for manual operations; corresponding per acre and per cent. figures would be 16s. 8d. and 29.9 per cent.

5. These Mean Inclusive yearly farming costs admit of being grouped together as follows:—

|                                                       | Costs     |       | Percentage. |
|-------------------------------------------------------|-----------|-------|-------------|
|                                                       | Per Acre. |       |             |
|                                                       | s. d.     | %     |             |
| 1. Management and Labor (including provisions) .. .   | 15 7      | 28.1  |             |
| 2. Buildings and Improvements (exclusive of Labor) .. | 0 7       | 1.0   |             |
| 3. Upkeep of Plant (including Horses) .. .            | 3 2       | 5.6   |             |
| 4. Purchase of Sheep and other Livestock .. .         | 5 1       | 9.1   |             |
| 5. Livestock Foodstuffs .. .                          | 9 1       | 16.4  |             |
| 6. Manures .. .                                       | 2 2       | 4.0   |             |
| 7. Seed .. .                                          | 3 9       | 6.7   |             |
| 8. Sundries .. .                                      | 3 0       | 5.4   |             |
| 9. Rates and Taxes .. .                               | 0 8       | 1.2   |             |
| 10. Interest on Capital and Overdraft .. .            | 3 3       | 5.8   |             |
| 11. Interest on Land Value (rent) .. .                | 9 3       | 16.7  |             |
| Yearly Inclusive Farming Costs .. .                   | 55 7      | 100.0 |             |
| Costs involving Cash payments .. .                    | 41 10     | —     |             |

#### MEAN GROSS OUTPUT OF FARM.

It is obvious that if a farm upon which Management and Labor are paid for in hard cash is to continue solvent a mean gross output of a value slightly in excess of mean expenditure figures must be secured. This mean gross output for Turretfield has been summarised in Table XI. for a period of eight successive seasons:—

TABLE XI.—*Summarising Value of Turretfield Mean Gross Output per Annum (1922-30).*

|                                                 | Sold or<br>Used. |       | Differences<br>of Opening<br>and Closing<br>Inventories. |       | Mean Gross Output. |              |                  |  |
|-------------------------------------------------|------------------|-------|----------------------------------------------------------|-------|--------------------|--------------|------------------|--|
|                                                 |                  |       |                                                          |       | Total.             | Per<br>Acre. | Per-<br>centage. |  |
|                                                 | £                | s. d. | £                                                        | s. d. | £ s. d.            | s.           | —                |  |
| 1. Crops—                                       |                  |       |                                                          |       |                    |              |                  |  |
| Wheat .....                                     | 1,537            | 4 10  | +41                                                      | 4 11  | 1,578 9 9          | 20/7         | 36.4             |  |
| Cereal Hay .....                                | 824              | 17 3  | —38                                                      | 5 8   | 786 11 7           | 10/3         | 18.1             |  |
| Barley .....                                    | 193              | 2 9   | —12                                                      | 6 1   | 180 16 8           | 2/4          | 4.2              |  |
| Oats .....                                      | 74               | 9 3   | —7                                                       | 7 4   | 67 1 11            | —/11         | 1.5              |  |
| Pease .....                                     | 65               | 10 11 | +1                                                       | 1 11  | 66 12 10           | —/10         | 1.5              |  |
| Totals .....                                    | 2,695            | 5 0   | —15                                                      | 12 3  | 2,679 12 9         | 34/11        | 61.7             |  |
| 2. Live Stock—                                  |                  |       |                                                          |       |                    |              |                  |  |
| Sheep .....                                     | 1,169            | 5 11  | +50                                                      | 0 5   | 1,219 6 4          | 15/11        | 28.1             |  |
| Pigs .....                                      | 248              | 5 1   | —43                                                      | 14 8  | 204 10 5           | 2/8          | 4.7              |  |
| Dairy Cattle .....                              | 106              | 0 0   | —9                                                       | 6 3   | 96 13 9            | 1/3          | 2.2              |  |
| Poultry .....                                   | 22               | 14 0  | —0                                                       | 7 6   | 22 6 6             | —/4          | 0.5              |  |
| Totals .....                                    | 1,546            | 5 0   | —3                                                       | 8 0   | 1,542 17 0         | 20/2         | 35.5             |  |
| 3. Miscellaneous—                               |                  |       |                                                          |       |                    |              |                  |  |
|                                                 | 135              | 2 11  | —16                                                      | 11 11 | 118 11 0           | 1/7          | 2.8              |  |
| Mean Total Farm Gross<br>Output per Annum ..... | £4,376           | 12 11 | —35                                                      | 12 2  | 4,341 0 9          | 56/8         | 100.0            |  |



It will be observed that over a period of eight successive seasons, the mean yearly value of Gross Farm Output from 1,533 acres of land, 17 per cent. to 18 per cent. of which was non-arable, has been represented by £4,341 0s. 9d., or 56s. 8d. per acre on the total area. Towards this harvested Crops have contributed £2,679 12s. 9d., or 34s. 11d. per acre, or again 61.7 per cent. of the total output; Livestock £1,542 17s., or 20s. 2d. per acre, or again 35.5 per cent. of total output; and Miscellaneous £118 11s., or 1s. 7d. per acre, or again 2.8 per cent. of total output.

MEAN RETURNS AT TURRETFIELD FROM AREAS CROPPED OR GRAZED RESPECTIVELY,  
1922-30.

From data summarised in Table XI. it is possible to determine fairly accurately the mean value of the yearly output secured during eight successive seasons from mean areas concerned with harvested crops only, on the one hand, and from those concerned with grazing Livestock (chiefly Sheep), only, on the other. Such information is of value in any attempt to assess the relative income-earning importance of Crops or Livestock on a mixed farm of the Turretfield type.

During these eight years the mean area under Harvested Crops has been 556 acres, and the mean area treated as Bare Fallow 420 acres; hence, the mean aggregate area allotted yearly to Harvested Crops has been 976 acres. It must be recognised, however, that these 976 acres have not been actively concerned with crops for more than nine months in any one year, and that over the balance of each year they have been available for grazing purposes. It follows therefore that on a per annum basis, these 976 acres are in actual experience equivalent to no more than 732 acres exclusively devoted to harvested crops, leaving the equivalent of 244 acres per annum available for grazing purposes. From this viewpoint a mean output of £2,679 12s. 9d. from harvested crops is equivalent to a return of £3 13s. 3d. per acre from land exclusively devoted to harvested crops.

On the other hand, the mean yearly area available for grazing purposes on the farm may be said to have consisted of the following fractions:—

- (1) 244 acres being the grazing yearly equivalent of 976 acres under crop or bare fallow for nine months in each year, but open to grazing over the remaining three months;
- (2) 290 acres of arable land temporarily out of cultivation or sown to grazing crops; and
- (3) 252 acres of non-arable grazing land.

Hence, over eight successive seasons the mean area open to grazing by farm Livestock has been equivalent in the aggregate to 786 acres.

The mean Value of Gross Output from Livestock has been shown in Table XI. to have been £1,542 17s. per annum; but since over this period foodstuffs have been fed from time to time to normally grazing Livestock, the figure given in Table XI. cannot be looked upon as being derived exclusively from the area open to grazing. From this figure must be deducted the mean value of farm produce fed to Revenue Earning grazing Livestock, namely, £228 19s. 10d. on the one hand, and of purchased foodstuffs used for the same purpose, namely, £33 3s. 3d. on the other. These deductions would have the effect of reducing Mean Gross Output from the exclusively grazed area to £1,280 13s. 11d. On the other hand, however, the latter figure should be increased by £48 4s. 11d., representing the mean value of agistment for Working Horses having access to the grazing area. Hence, the Net value of the Mean Output from that portion of the Farm exclusively grazed has been represented by £1,328 18s. 10d., or £1 13s. 10d. per acre per annum, as against £2,679 12s. 9d., or £3 13s. 3d. per acre per annum from the area exclusively devoted to crops.



The Mean Net Profit from the mean area devoted to Crops on the one hand and to grazing on the other may be determined approximately as follows:—

|                                      | Area Devoted to Crops. |   |       | Area Devoted to Grazing. |   |       |
|--------------------------------------|------------------------|---|-------|--------------------------|---|-------|
|                                      | s.                     | £ | s. d. | s.                       | £ | s. d. |
| Mean output per acre .....           | —                      |   |       | —                        |   |       |
| Mean Expenditure per Acre—           |                        | 3 | 13 3  |                          | 1 | 13 10 |
| 1. Interest on land (rent) .....     | 10/5·5                 | — |       | 8/4·4                    | — |       |
| 2. Interest on Working Capital ..... | 4/8·5                  | — |       | 1/10·9                   | — |       |
| 3. Rates and taxes .....             | —/9·5                  | — |       | —7·6                     | — |       |
| 4. Labor .....                       | 22/3                   | — |       | 9/8·6                    | — |       |
| 5. Other expenditure .....           | 34/0·5                 | 3 | 12 3  | 14/4·5                   | 1 | 15 0  |
| Mean Net Profit per acre .....       | —                      | 0 | 1 0   | —                        | — | —     |
| Mean Net Loss per acre .....         | —                      | — | —     | —                        | 0 | 1 2   |

These figures, which show a small profit on Crops and a loss on Grazing, reflect the results of successive bad seasons and gradually falling prices for farm produce on a farm on which Management and Labor are paid for in Cash.

#### INITIAL CAPITAL REQUISITE TO THE SUCCESSFUL WORKING OF A 1,000-ACRE FARM OF THE TURRETFIELD TYPE.

It will probably be recognised in this connection that apart from the position of the average man working in an average season, the minimum initial Capital requisite to the successful working of a Farm would be dependent upon three chief factors, namely:—

- (1) Individual capacity.
- (2) Seasonal conditions over opening years; and
- (3) Current market prices over the same years.

In other words, if an individual farmer have high technical capacity, coupled with good business acumen, if in the opening years of operation he should have the advantage of seasonal conditions and market prices above normal means, it is highly probable that this exceptionally favored individual would be in a position to start farming on a minimum Capital which would lead to disaster the average man facing average or unfavorable conditions. In the development of new country it is, however, inevitable that such implied risks should have frequently been taken. And unfortunately in such circumstances failures have usually outnumbered successes. But, in this connection, it is not my intention to try and determine what should be the minimum Capital upon which the exceptional man could afford to start farming when faced with favorable conditions, but rather to show from the recorded data of eight successive seasons what personal Capital would have been essential to an average man facing similar conditions in order to work successfully a 1,000-acre farm of the Turretfeld type.

We must assume a farm of this character to be situated on the heavier land of Central or Lower North Statistical Divisions and to consist of from 820 to 830 acres of arable land, including 9 to 10 acres under buildings, yards, plantations, &c., and 170 to 180 acres of rough grazing land. It may be assumed that a farmer seeking to acquire and work such a farm on a minimum of initial Personal Capital would be able to secure mortgage and loan facilities to the extent of two-thirds of the value of his Capital assets. Reference to Table VII. shows that the Capital requisite to the purchase and equipment of a farm of this type would be represented by £12 3s. 2d. per acre, or for a 1,000-acre farm, approximately £12,000. In the circumstances, the minimum Personal Capital essential to the purpose would be in the neighborhood of £4,000, whilst £8,000 would represent the extent of Loan liabilities, involving at 7 per cent. interest charges of £560 per annum, or 11s. 2d. per acre.

I shall now endeavor to show on the basis of results of eight seasons at Turretfeld—1922-30—the extent to which anticipated Revenue and Expenditure would justify farming operations with an initial Personal Capital equivalent to one-third of the value of Capital engaged in the farm.



Reference to Table X. shows that mean yearly expenditure at Turretfield involving direct cash payments has been at the rate of 41s. 10d. per acre. In this figure, however, are included 12s. 7d. paid out in wages, to which should be added 3s. for provisions consumed and 11s. 4d. for interest charges per acre. On the farm that we have in view interest charges have been assumed to be at the rate of 11s. 2d. per acre, and if, as is usually the case, the farm were worked almost exclusively by the farmer and his family, cash payments for wages would to all intents and purposes disappear. In lieu of the latter, however, an adequate sum for the upkeep of the farmer and his family would have to be provided, and towards that end I suggest £300 per annum, or 6s. per acre. Hence, in lieu of the Turretfield figure of 26s. 11d. per acre towards payment of interest and wages, a sum of 17s. 2d. per acre should suffice on a farm worked mainly by a farmer and his family. It follows, therefore, that in such circumstances total Cash outgoings per annum need not exceed 32s. 1d. per acre, or £1,604 on a 1,000-acre farm.

Again, reference to Table XI. shows that at Turretfield the mean value of Farm output per annum has been at the rate of £4,341 0s. 9d., or 56s. 8d. per acre. Of the latter sum, not less than £3,323 have represented direct Cash receipts. Hence, in the circumstances already indicated, a farmer working a 1,000-acre farm of the same type could anticipate a mean farm output of £2,832, of which not less than £2,168 would represent direct Cash receipts. Output on this scale would be more than adequate to meet estimated mean Cash outgoings of £1,604, and would leave ample margin for unforeseen emergencies and occasional payment of casual hired labor.

I conclude, therefore, that in competent hands a Personal Capital of £4,000 should suffice for the purchase, equipment, and working of a 1,000-acre Farm of the Turretfield type.

#### GENERAL EXPENSES ACCOUNT.

In any business occupation, and to a greater extent in farming than in any other, numerous items of expenditure are incurred in the course of a year's operations which cannot readily be debited against any particular Real Account. In the aggregate, these items of expenditure represent the overhead charges which must eventually be distributed among Revenue Earning Accounts, and usually in proportion to the relative monetary importance of each.

In Table XII. below have been summarised mean General Expenses incurred at Turretfield over eight consecutive seasons:—

TABLE XII.—*Summarising Mean General Expenses per Annum Incurred at Turretfield (1922-30).*

|                                                 | 1922-30 Mean General Expenses per Annum. |       |           |           |
|-------------------------------------------------|------------------------------------------|-------|-----------|-----------|
|                                                 | Total.                                   |       | Per Acre. | Per cent. |
|                                                 | £                                        | s. d. | s.        | %         |
| 1. Interest on Floating Capital and Overdraft . | 247                                      | 8 7   | 3/3       | 35·8      |
| 2. Wages .....                                  | 240                                      | 7 8   | 3/2       | 34·8      |
| 3. Depreciation .....                           | 78                                       | 12 8  | 1/-       | 11·4      |
| 4. Rates and taxes .....                        | 53                                       | 12 10 | -/8       | 7·7       |
| 5. Sundries .....                               | 44                                       | 16 11 | -/7       | 6·5       |
| 6. Use of implements .....                      | 15                                       | 0 6   | -/2       | 2·2       |
| 7. Use of horses .....                          | 11                                       | 7 10  | -/2       | 1·6       |
| Totals.....                                     | 691                                      | 7 0   | 9/-       | 100·0     |
| Mean Yearly Total Expenditure .....             | 4,261                                    | 17 4  | 55/7      | —         |
| Percentage of Total Expenditure .....           | —                                        | —     | —         | 16·22     |

Thus, then, over a period of eight years "General Expenses" at Turretfield have been represented by a mean value of £691 7s. per annum, or 9s. per acre, or again 16.22 per cent. of a Mean Total Expenditure incurred.

[To be continued.]



## THE IMPORTANCE OF CROSS-BRED WHEATS TO SOUTH AUSTRALIA.

[Summary of an address delivered to the Rotary Club by W. J. Spafford,  
Deputy Director of Agriculture.]

The Wheat crop is of the greatest importance to this State, as can be seen by a glance at the following Table:—

### *Value of Production—Means, 1924-1928.*

|                          |             |
|--------------------------|-------------|
| Total value .....        | £39,263,747 |
| <i>Agricultural—</i>     |             |
| Wheat .....              | £9,340,493  |
| Sheep .....              | 6,312,665   |
| Vines .....              | 1,996,680   |
| Other livestock .....    | 3,540,083   |
| Other crops .....        | 3,364,817   |
|                          | £24,554,738 |
| <i>Non-Agricultural—</i> |             |
| Manufactures .....       | 12,393,445  |
| Mining .....             | 1,447,107   |
| Miscellaneous .....      | 1,268,457   |
|                          | £14,709,009 |

These figures disclose that of a total value for production of about 39½ million pounds, agriculture provides about 24½ million pounds, and of this the Wheat crop accounts for about 9½ million pounds.

Perhaps the position of the value of our overseas exports is of still more importance in a country with no manufacturing advantages, because from exports we receive new money, and the principal export lines are:—

### *Value of Oversea Exports—Means, 1924-1928.*

|                                   |             |
|-----------------------------------|-------------|
| Total Value of Exports .....      | £17,621,555 |
| <i>Agricultural Exports</i> ..... | £13,356,797 |
| Wheat .....                       | £6,525,212  |
| Sheep .....                       | 5,219,960   |
| Vines .....                       | 873,979     |

The value of agricultural overseas exports represents 76 per cent. of the value of total exports, but if we make allowance for the value of the New South Wales' material we export overseas from Port Pirie, the proportion of agricultural exports to total exports becomes 90 per cent. Of these overseas exports Wheat has brought in about 6½ million pounds per annum, and is our principal exportable product.

Last year South Australian farmers grew 212 varieties of Wheat, but most of these were grown on very small areas. As a matter of fact, the nine most important wheats of the State—each of which was grown on over 100,000 acres—covered a total area of about 2½ millions of acres, or 69 per cent. of the total area of about 4,000,000 acres. The 20 most important wheats grown were harvested from about 3½ millions of acres, or 87 per cent. of the total area reaped. By examining a list of the areas sown to various wheats, it shows that:—

- (a) Although farmers grow a lot of varieties of wheat, relatively few kinds are used on the great bulk of the area sown;
- (b) Of the principal wheats of the State, only one—Gluyas—was known 30 years ago;
- (c) All of the most important wheats, except Gluyas, were produced by specialists in plant breeding;



- (d) Of the nine most important wheats grown here, five originated at Roseworthy Agricultural College;
- (e) The area sown to Roseworthy Wheats aggregated about 1½ million of acres last year, and equalled 37 per cent. of the total area sown.

We have made considerable progress in wheat growing in the past 40 years, as shown by the average yield secured per acre for each of the four decades:—

*Progress of Wheat Growing since 1889.*

| Decade.           | Mean area harvested. |  | Mean yield per acre. |    |
|-------------------|----------------------|--|----------------------|----|
|                   | Acres.               |  | Bush. Lbs.           |    |
| 1889-1898 .. .. . | 1,646,976            |  | 4                    | 48 |
| 1899-1908 .. .. . | 1,766,668            |  | 7                    | 40 |
| 1909-1918 .. .. . | 2,310,095            |  | 10                   | 31 |
| 1919-1928 .. .. . | 2,547,090            |  | 11                   | 7  |

Although much of the increased wheat yield is due to improved cultivation practices, the use of superphosphate, &c., still we feel that quite a lot of it can be credited to improvement in the varieties of wheat now being grown. If during the past 20 years, when a lot of the improvement has taken place, we allow that only 1 bush. per acre of the increase is due to the use of Australian-bred wheats, the increase was worth to South Australia, at the actual average price received during the period, 12½ million pounds, or £635,000 per annum. If we allow that half-bushel per acre of the increase was due to the introduction of Roseworthy wheats, the increased value to the farmers of the State would be 6½ million pounds, or £317,500 per annum. There is no way of arriving at the actual increase due to the breeding of new wheats, because improvements are being made all along the line, but if only one-quarter of the increase suggested has resulted from the breeding of the new wheats at Roseworthy College, which were sown on 1½ millions of acres last year, the total expenditure on the institution has been repaid many times.

The cross-fertilization of wheat is a very simple operation. The flowers are hermaphrodite, i.e., possess both female and male organs, and cross-fertilization consists in extracting the male organs from a few flowers on a wheat head, replacing them with pollen sacs from the variety which is to be the male parent, removing all unfertilized flowers from the head, and protecting the remainder so that they will not be interfered with by wind or insects.

Although cross-fertilizing wheats is very easy, it is quite another matter when it comes to "fixing" useful new varieties resulting from the cross-breeding, and considerable difficulty is experienced in this direction. Every wheat variety is a combination of a large number of separate characters, most of which answer to Mendel's Law, and as such are *dominant* or *recessive* to the opposite of that character. When such opposed characters are mated together they do not combine, but remain as separate characters in the offspring, and the *recessive* character is always overshadowed by the *dominant*. For instance, if a beardless wheat is mated to a bearded variety the first generation offspring is always beardless, no matter which kind was used as female parent, beardlessness being *dominant* to beard. In the second generation about one-quarter of the plants are bearded, and will always throw true-to-type, whilst three-quarters are beardless, and one-third of these will always throw true-to-type, whereas the other two-thirds continue to throw the same mixture of three *dominants* to one *recessive*. Where two characters are concerned, such as brown chaff and beardlessness, mated to white chaff and bearded, the possible combinations are considerably increased. Absence of



beard and brown chaff being *dominant* characters, the first generation offspring are all brown and beardless. In the next generation the plants are approximately in the following proportions, of:—

Nine brown-beardless, three brown-bearded, three white-beardless, and one white-bearded.

The complications become greater and greater as the number of characters concerned are increased, and for a single character the possible combinations are four; for two characters the possible combinations are 16; for three characters the possible combinations are 64; for four characters the enormous number of 256 possibilities is reached, and so on, as the opposed characters increase.

The separation of a useful new variety from the very great assortment resulting from a cross of two distinct kinds of wheat is a very difficult matter, as can be realised, and in some cases takes many years to "fix" so that it reproduces itself true-to-type. It is because of the knowledge required, and the difficulty experienced, that it is essential for the work to be done by specialists, and as it is important that the work be continued in a wheat-growing country such as is South Australia, every encouragement should be given to those engaged in the work.

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## ORCHARD NOTES FOR SOUTHERN DISTRICTS, NOVEMBER, 1930.

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[By CHAS. H. BEAUMONT, District Horticultural Instructor].

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This month will probably decide the amount of fruit to be harvested and also its quality. Apricots and peaches should be thinned off if the crop sets too thickly. By doing this there will not be a sacrifice of quantity, and the best quality will be obtained, and therefore a better price. When picking, keep the riper ones away from the firm ones and pack separately; good peaches are worth placing on trays.

Grap growers must continue to watch for "Downy Mildew," as vineyards are liable to get it if the season keeps moist; use "Bordeaux Mixture," either wet or dry, so soon as the mildew is noticed and prevent its spread. For "Oidium" use sulphur dust. If young vines are being attacked by "cutworm," dust with arsenate of lead. Codlin moth must be kept in check; so far we have no better remedy than arsenate of lead, but many are trying Volek or Alboleum oils.

Strawberries require considerable attention. Weeds must be kept down; a mulch improves the crop. Paper mulch is easily applied and will last two seasons; it will check the weeds. Packages of strawberries should be even throughout and not be topped up with a layer of large ripe ones and small green ones lower down. Be ready to stop cherry or pear slug; a light dusting with arsenate of lead will stop it. Hawthorn and other shrubs are often attacked by this insect.

Orchard and vineyard soil should be kept lightly stirred to prevent the penetration of heat; especially see to this close to the main stems. Weeds must be kept away from the trees and vines.

Trays and equipment for drying fruit should be put into good order and be thoroughly cleaned, to be ready for use if there is excess fruit; there is no need to waste any fruit which is well grown. Portable dehydrators are now obtainable and are not difficult to erect.



## "TAKE-ALL" AND "NO-GROWTH" DISEASES OF WHEAT AND OTHER CEREALS.

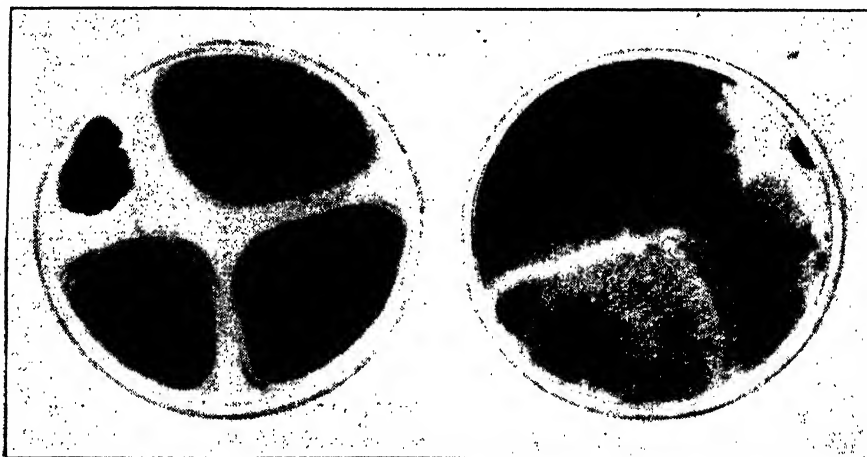
### REQUEST FOR SPECIMENS.

[By S. D. GARRETT, B.A., Waite Agricultural Research Institute.]

During the past winter many specimens of wheat and other cereals affected with the "No-growth" disease have been examined at the Waite Institute. (By the term "No-growth" is understood the stunting and killing of wheat and oats in the early stages of growth; the term "Take-all" as here used refers to the empty ears and dead or dying condition of plants at the heading stage, and in this sense, therefore, is synonymous with the terms "Whiteheads" and "Hay-die," also used to describe this condition.)

Some of the "No-growth" patches have been found to be due to attack by the nematode, or eelworm, *Heterodera schachtii*; from other patches, however, a number of different fungi have been obtained. Of these, two are of major importance—*Rhizoctonia* sp. and "*Brachysporium*."

*Rhizoctonia* sp. was first recorded as causing a "No-growth" disease of wheat and oats in South Australia by Samuel (this journal, vol. XXXII, pp. 40-43) in 1928. It has also been reported as causing a similar disease of cereals from India, Italy, and the United States of America. The fungus has again been isolated this winter from a number of "No-growth" patches in different parts of the State.



Two Petri Dishes containing (left) three colonies of "*Brachysporium*," and one colony of *Helminthosporium sativum*, and (right) two colonies of *Rhizoctonia*, all growing out from pieces of diseased wheat stems.

Of equal importance appears to be a fungus which has been given the temporary name of "*Brachysporium*" (a culture has been sent away for expert identification); it approximates very closely to the species *Acrothecium lunatum* Wakker, which has been recorded on cereals from India, Ceylon, and the Gold Coast. Unlike *Rhizoctonia* sp., this fungus has been isolated from "Take-all" patches by the Plant Pathologist, Mr. Samuel, in previous years. It has not, however, been isolated from "No-growth" patches previous to this year. The damage caused by this fungus is often considerable, more than half the paddock frequently being thus affected in the early stages of growth, though it is probable that other factors as well as the fungus are contributory to an attack of such severity. A characteristic feature of the "*Brachysporium*" disease



(which has already been remarked for the *Helminthosporium sativum* footrot of wheat by W. M. Carne, *Western Australian Agricultural Journal of Agriculture*, Vol. IV., 1927) is that the affected areas may be of any size and shape, and that, furthermore, single diseased plants may be found scattered right through the crop. The Rhizoetonia disease, on the other hand, is always found in patches approximately circular, and generally of more limited extent. This is doubtless due to the fact that Rhizoetonia spreads from a chance starting point in the soil by outwards growth in all directions simultaneously, as does the Mushroom fungus, whereas "Brachysporium" is widely distributed over the surface of the paddock by means of its wind-borne spores.

A third fungus obtained from "No-growth" patches, but of considerably less frequent occurrence, is *Helminthosporium sativum*, P.K. & B., which is of world-wide distribution, and has been shown in America to attack all cereals and many species of grasses.

Tests are at present being conducted with these fungi, in order to discover, firstly, a resistant variety of wheat, and, secondly, their respective host ranges. Thus, if "Brachysporium" can attack wheat, barley, oats, and rye, as is thought very probable, control of the disease by the rotation of oats or barley with the wheat will obviously be out of the question.

*Farmers are in a position to render very material assistance to these investigations.* It is asked that those who have "Take-all" on their land, especially in paddocks where "No-growth" has been observed earlier in the season in this or previous years, may be kind enough to send specimens of "Take-all" to the Assistant Plant Pathologist, the Waite Institute, Glen Osmond. Where possible, a bundle of not less than 50 plants should be sent, the roots and 6in. of the straw being all that is required for the isolation of the fungus. Specimens should be accompanied by a statement as to whether "No-growth" has appeared in the same paddock earlier in the year. Those so doing will be informed in due course as to the particular fungus causing the "Take-all" condition in their plants.

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## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

## FORTY-FIRST ANNUAL CONGRESS.

[Continued from page 282, *Journal of Agriculture*, October, 1930.]

Tuesday Morning, September 16th.

## PASTURES AND PASTURE MANAGEMENT.

Mr. L. J. Cook, B.D.A. (Manager Kybybolite Experimental Farm), read the following paper:—

In growing and handling pastures, as in producing a crop of wheat, oats, or barley, one should have an ideal of perfection in one's mind. In breeding animals we always have a model of the most perfect type in our mind, to which we strive to breed a herd or flock, and to do this every attention is necessary to be paid to their fodder. Breeding counts a lot, but feed is equally as important, and best quality feed is necessary to produce best quality stock. Pasture is the most economical feed for livestock, and hence the importance of making pastures the best possible.

## AN IDEAL PASTURE.

The study of pasture is quite different from that of hay or grain crops. With the one, the initial and early growth, and its persistent production is the important object; whereas with the hay or grain crops we aim for perfection in fully matured plants. It has long been known by the practical grazier that the young, early growth of grass is more nutritious and palatable to livestock than the older or more fully developed growths, and during the last decade scientists have spent much on pastures, and have proved theoretically that this short young growth is particularly nutritious. When deprived of the water contained in young grass the dry matter is a highly concentrated food, equal to such foods as linseed meals, cakes, &c. Especially is this so when grass has been produced from rich or well-fertilised soils. Knowing this fact, the first quality for which we look in an ideal pasture is young grass about 1½ in. to 3 in. high.

The second factor is the thickness and evenness of sward. All the land should be occupied by the pasture plants; no bare spaces, or moss-covered patches, but the soil should be covered like a lawn. Patches of rankness inches higher than the rest, where a heap of dung or organic matter has been dropped, or growths of inferior weeds are not required.

Thirdly, the color. An ideal pasture should be a beautiful, healthy, bright-green color, not dull and dark, or a sickly yellow through lack of correct fertilisation, drainage, or management.

Fourthly, the composition of the pasture. Our ideal should contain a mixture of the good feeding types of grasses and clovers, approximately 70 per cent. to 75 per cent. of grasses, and 25 per cent. to 30 per cent. clovers. The numbers and varieties of these must naturally vary according to local conditions of soil and climate and the ability of species to thrive, but the greater the mixture of palatable types the better.

Such a pasture as pictured above is ideal for growing and milk-producing livestock.

In countries with adequate, evenly distributed rainfall, such as England and New Zealand, this ideal of pasture is possible to maintain constantly throughout the bulk of the twelve months of each year. Probably only in our extreme South-East, or where irrigation is available, could such be obtained in South Australia. However, our aim should be, where we make pasture our main crop, to have this ideal available for as long in the year as we possibly can.



On much of our pasture land we can characterise the growth of plants as follows:—A fair growth in late autumn and early winter, according to the quantity and frequency of early rains, whilst the soil is warm. A check in development during the winter months, varying, of course, in districts, but mainly controlled by soil temperatures, which are in turn largely affected by the amount of organic matter present in the soil. Then in the spring of the year comes the flush, a more or less rapid and quick growth of plants towards maturity. During the summer months green growths are limited to our rather unreliable rainfall of that period.

Our aim should be to so treat and manage our pastures to encourage more or less continuous even growth, particularly during the winter months, and endeavor to extend the growing period, so that the young growing grass would be available for as great length of the season as possible. This would not only be advantageous to the sheep grazer, but infinitely valuable to the dairyman, who can by this means supply rich, succulent food to his milkers.

So much for the aims and ideal of pasture. Ways and means of improvement at hand are as follows:—

- (1) Fertilising or manuring.
- (2) Sowing suitable mixtures of seeds.
- (3) Rotation of grazing.
- (4) Harrowing.
- (5) Mowing.

#### FERTILISING PASTURES.

By manuring correctly more can be gained towards ideal pastures probably than by the other methods. All are supplementary one to the other, but except perhaps in the case of extremely rich soils, the sowing and cultivation of suitable seeds, and the correct grazing of pastures, would be comparatively useless without resorting to the use of manures.

We have long since discovered that pasture plants require feeding with artificial manures, just as much as our cereal and other crops. Like them, phosphatic fertiliser is the first and most important required, simply because most of our soils lack this mineral naturally, and because readily available phosphatic fertiliser, such as superphosphate gives such added strength to young plants, and helps them to obtain a strong root-hold in their early life. As regards the form and quantity of phosphatic fertiliser to apply, this is liable to vary in different districts. Generally speaking, the water soluble form superphosphate is the best to use, and gives the quickest return. On certain naturally slightly acid soils, such as we have in the red gum lands of the South-East, citrate and acid soluble phosphates have given very good results, and in wetter seasons have given equal results with superphosphate, at a slightly reduced cost; but, taking the average for the past five seasons, superphosphate has, even on these soils, given the greater yield of pasture. For instance, some Kybybolite results on red gum land, with an annual rainfall of 19½ in., show that an annual dressing of 1 cwt. 45 per cent. superphosphate increased the carrying capacity on sown pasture 135 per cent., whilst a single dressing of 6 cwt. 61 per cent. Ephos phosphate and 4 cwt. 82 per cent. Island phosphate increased similar pasture 122 per cent. and 79 per cent. respectively, and a single combination dressing of Island Phosphate and Super increased 110 per cent. With natural pastures super increased carrying capacity 118 per cent., whilst Ephos Phosphate increased 101 per cent. and calcium rock phosphate increased 115 per cent. In perusing the grazing for the five winters, taking the months May, June, July, and August, we find that the proportion of carrying capacity has been similar in increase. The rainfall for these four months for the five years has, on the average, been 11.3 per cent. below the means for the past 24 seasons, and not in any of these seasons, during the winter period, has the rainfall reached the mean. Had the seasons been wetter, we could have possibly expected a greater response from the less soluble phosphatic fertilisers.



With reference to quantity of phosphatic fertiliser to apply, we have found that annual dressings of superphosphate give the more even results, and so far as tests have gone greatest production of pasture has been secured by the application of 180lbs. 45 per cent. per annum. The results from Wimmera Rye Grass and Subterranean Clover for the past two seasons have been:—

4.86 sheep per acre carrying capacity from 180lbs. 45 per cent., or 312 per cent. increase.

4.21 sheep per acre carrying capacity from 90lbs. 45 per cent., or 257 per cent. increase.

2.64 sheep per acre carrying capacity from 45lbs. 45 per cent., or 124 per cent. increase.

1.18 sheep per acre carrying capacity from no manure (check plot).

Comparing the Winter grazing for the immediate past three seasons on these particular plots we find that 45lbs. 45 per cent. Super has increased the winter grazing 59 per cent., 90lbs. 45 per cent. Super increased 111 per cent., and 180lbs. increased 119 per cent. These results show that with this class of pasture, that at least applications of 90lbs. 45 per cent. super annually would be amply repaid, and with sheep at a reasonable value applications up to 180lbs. would pay.

In the top-dressing of superphosphate on natural pasture we find that the carrying capacity for four annual applications of 90lbs. 45 per cent. to be 1.55 sheep per acre, an increase of 125 per cent. above check plot, whilst four annual applications of 180lbs. 45 per cent. has carried 1.70 sheep per acre, or 146 per cent. increase above no manure, and 21 per cent. increase on the 90lb. application. The heavy application, therefore, has not in this case proved payable.

#### POTASSIC FERTILISER.

Potash is known to have a good effect on the growing tissues of plants, more especially on pasture plots and root developing crops. Consequently, it could be anticipated that potassic fertilisers would have a beneficial improvement on the development of our pastures. Tests of it on Subterranean Clover and Wimmera Rye Grass pasture have been carried out at Kybybolite for five seasons. Only a small annual application of 37lbs. 90 per cent. Sulphate of Potash has been applied. This is equivalent to approximately 18lbs. soluble potash per acre, and costs in Adelaide about 4s. 8d. This dressing when applied without any phosphatic fertiliser has given an increase of 0.58 sheep per acre, or 38.7 per cent. above no manure. The same dressing when applied with rock phosphate has given an increase of 0.45 sheep per acre, or 33.8 per cent. above that receiving only an equal amount of rock phosphate. Hence, from these two results it appears that on this class of pasture an application of potash will give an increase of  $\frac{1}{2}$  sheep per acre at a cost of 4s. 8d. for fertiliser, plus cost of application. From this point of view it is scarcely a payable proposition, but investigation is yet necessary to discover whether potash fertiliser, in addition to phosphatic, will give an improved health to stock or a greater development to carcase, wool, or milk production.

#### NITROGENOUS FERTILISER.

Nitrogen has a good effect on growth development, especially on leaf and stem of grasses. Instance the quick response of lawns to the application of sulphate of ammonia, it can therefore be expected that when applied to pastures, nitrates would help the better grasses to overcome weeds, and particularly to improve growth during winter months, when wet and cold conditions are liable to cause a shortage of nitrates in available proximity to plant roots. The nitrates of the soil are greatly increased by the clovers of pastures, which fix the nitrogen of the air in available plant food form in the soil by the aid of soil bacteria. It is somewhat doubtful, therefore, whether artificial nitrogenous fertilisers applied to old-established clover pastures would show much added benefit. However, little work has as yet been done to test the results of applications of these fertilisers. Tests have been commenced, and indications are that they will give a quick impetus to the growth of grass in pastures, and by being applied



in the late autumn they will increase the amount of winter feed and improve its color and appearance. We have yet to test the economics of applying this comparatively costly fertiliser, but it is possible under an intensive pasture system that dairy farmers will obtain good remuneration from the use of nitrates applied with phosphates.

#### LIME.

Lime is more a soil amendment than a fertiliser, and as such plays a good part in improving the fertility of soils, by making the natural ingredients of soils available for use of plants. There is quite a large area of land in South Australia needing lime before bringing it to full fertility, and those most urgently needing lime are those in which sorrel quickly thrives when land is cultivated. This type of land is suitable for the cultivation of Subterranean Clover and Rye Grass pastures, on which we have been experimenting for the past five or six years. Results so far have shown that the average annual carrying capacity of this pasture dressed with lewt. 45 per cent. Super. per annum is 3.95 sheep per acre, whilst that dressed with Lime as well as equal dressings of super has carried 3.70 sheep per acre. Lime has, therefore, depressed the yield of pasture by  $\frac{1}{4}$  sheep per acre, and in only one out of the five seasons under review has the Lime and Super plot exceeded that of super only. This was the fifth and most recent season; the one furthest removed from the application of lime.

In considering the winter feed, we find that for the four months—May, June, July, and August—the average on the Lime and Super plot has been 3.45 sheep per acre as against 2.93 sheep per acre on the plot which received super only. These figures are a true indication of the effect of lime on this pasture in this type of soil. The limed plots invariably make quicker and better growth throughout the Autumn and Winter months, and cause a better growth of grass and a greater variety of plants to appear in the pasture. There is apparently less clover and a consequent reduction in the quantity of late summer feed.

In considering the effect of lime applied to the natural pastures of this type of soil we find a greater advantage showing for lime against super. For instance, during the same five seasons, 1925-30, Lime and super applied to the natural uncultivated pastures have carried an average of 2.30 sheep per acre as against super only carrying 1.92 sheep per acre. Similar land unimproved has carried 0.88 sheep per acre, hence the increase over no manure has been 1.42 sheep per acre in the case of lime and super and 1.04 sheep in the case of super only. Hence the increase due to lime shows as 0.38 sheep. Comparing the four winter months—May to August—the lime and super plot has carried 2.05 sheep and Super only 1.90 sheep per acre, which again shows an advantage in winter feed provided by the application of lime.

With reference to the quantity of lime, these plots are based on an application of 1 ton per acre every 10 years. One ton per acre will sweeten or neutralise the surface soil of this type, and will maintain it so from 8 to 10 years. The cost of a ton application will, of course, vary with the nearness of the place of supply, but in most districts it should be available at £2 or 45s. per ton. This, plus cost of carting and spreading, should be on the land for £3 at the most.

#### TIME OF APPLYING FERTILISER TO PASTURES.

Topdressing of pastures should be done in the Autumn months so that plants can secure the benefit of fertilisers during their initial growth, and are thereby able to be at their best during the winter months, and have the full benefit during the whole of their growing period. Spring applications will be beneficial when pastures have been extremely hard fed during winter.

In summarising the fertilising of pastures, note that superphosphate gives the greatest return in bulk of feed throughout the whole year, and that applications of lewt. per acre give good payable returns.

Agricultural lime, in addition, gives improved winter growth, and a greater variety of plants, with a better percentage of grass.



Nitrogen and Potash fertilisers both cause increased growth, but at present prices of commodities it is doubtful whether remunerative returns can be gained by their use.

Figures quoted are the results so far secured from work carried out at Kybybolite. We have not yet been able to study the effect of manuring on the growth and development of sheep and wool, or on milk production. Practical experience shows that larger frames, and more wool, and milk are produced, but actual figures are not yet available.

#### SOWING SUITABLE MIXTURES OF SEEDS.

There is a great variation in the types of plants that constitute a pasture, but the main and most important are the grasses and clovers. These in themselves vary immensely. The period of growth is markedly different, some being more prominent in winter, while others show their best during the flush of the season, and others prefer the hotter months of summer. Soil types and conditions have an effect, some plants being particularly amenable or adverse to certain sorts of soils. They vary in palatability, stock preferring certain types more than others, although this factor can be largely altered by correct handling and fertilising.

The aim is to find the types that suit local conditions and encourage the best from them. For instance, where Subterranean Clover and Rye Grass will thrive make them the best possible, or where rich flat land is available encourage better clovers such as Strawberry, White Dutch, Alsike, and Trefoil, with grasses such as Perennial Rye, Cocksfoot, Phalaris, etc.

In considering the seeding of pastures three matters are of importance. First secure good sound seed of high germinating ability from a reliable source. Secondly, remember that clovers are very useful and needed in pastures, but at the same time, all clover and no grass is not the best pasture. An ideal pasture contains only 25 per cent. to 30 per cent. clover, and it is up to the agriculturist to see that the 60 per cent. or 70 per cent. of grass is of good species.

When Subterranean clover is first sown in its good environment, it tends to monopolise the soil, but after a few years will become grassy with naturalised types such as Sterile Brome, Silver, and Barley Grass. The qualities of these, especially in certain stages of their growth, are quite all right, but better are available. Hence, encourage better grasses, particularly good winter growers such as the Rye Grasses and types of Phalaris. The feed of these is superior to that of the naturalised types, and if given a chance will tend to keep the others in check. It is advisable to always sow grass with clover.

Thirdly, when establishing a pasture, give it a good start by preparing the land well. Few farmers would expect to produce first class crops without fallowing and well preparing the land. The same applies to pastures, preparing the soil well or even fallowing often means the difference between success and failure. It is a very convenient method to sow Subterranean Clover and Wimmera Rye Grass with a cover crop, but in many cases better stands are obtained by sowing them as a mixture without the cover crop, and handling them correctly. Where mixtures of finer seeds are sown it is imperative to prepare a really good fine seed bed.

#### ROTATION OF GRAZING.

The grazing of a pasture is all important, and correct management means the carrying of more and healthier stock.

The old idea of sheep in every paddock is not a good practice on improved pastures. Strictly speaking, there should be at least four fields for every flock or herd, so that the pasture is grazed down quickly and evenly, and then left for a period to make further healthy growth. By this means plants are able to strengthen their roots. When stock are running indiscriminately over a large area they pick out the choicer patches and concentrate upon them, and when plants are consistently nibbled off at soil surface their roots are unable to function fully through shortage of ingredients brought



to them through their leaves. Hence pastures should be allowed to grow undisturbed until they are 1 in. to 2 in. high, and then grazed off comparatively quickly. By adopting a system of rotation with grazing fields, which should be as near as practical of an equal area, farmers could have a more or less continuous supply of young grass available. On pastures in the South-East grazed in this way, 10 to 12 sheep are used to the acre, and pastures thereby are given three weeks spell in every four during the winter months. As the flush of the season approaches certain fields are left for haymaking, and flocks are concentrated on fewer fields with less changes. The size of fields should vary according to the type of stock, and the size of flocks and herds. From 20 to 25 acre fields are a suitable size for sheep flocks of from 200 to 250 head under Kybybolite conditions. Under good dairying conditions even smaller fields will probably be found more advantageous. We read of New Zealand and English dairymen with fields no larger than five or six acres, which they graze with 12 cows to the acre at a time.

#### HARROWING.

The harrowing of permanent pastures that have been heavily stocked is most important, as the spreading of the droppings of livestock evenly over the soil surface leads to greater and more even fertility. Droppings, if not broken and scattered, cause an excess of organic matter on certain portions of pastures, causing rank and unpalatable growths. These growths are the last that stock will eat when grazing on a field, are not of high feed value, and their production should be discouraged.

Good pastures that carry up to half cow or more per acre soon become thickly dotted with manure droppings, and it becomes essential to treat such fields. Harrowing is the best means, and pasture harrows are now available that will do satisfactory work. They are many tined and are short in the tooth. Dragged forward in the Autumn months, they give a good stirring to the pasture surface, and when used, reversed, during the Winter months after grazing, they will fairly readily scatter the fresh droppings without materially affecting the sole of grass. The use of pig netting weighted down also is a good means of spreading manure droppings.

#### MOWING.

The use of the mower is becoming increasingly necessary every season. Its importance is becoming realised when maximum production is desired from our pastures. Growing pastures can be improved, if rank patches are mown off when not consumed by grazing stock. The fresh growth that follows is usually much more palatable, and will be eaten more readily by stock. However, the greater use of the mower is in the making of hay. Under conditions such as our Winter rainfall areas, where we naturally have a heavy flush growth in the Spring followed by a comparatively dry period during summer and early autumn, when green growths are mostly absent from our pastures, some provision is necessary to carry our stock over the dry period. It is not practical to always stock our pastures to the full capacity during the flush season, consequently it pays to shut off certain fields from grazing at this period, and when about at their complete vegetative growth, mow them, and turn the pasture into valuable meadow hay, which can be stored and utilised during the lean periods of the year. These fields when mown and cleared of hay will respond to late spring and early summer rains, and give a green picking to livestock later into the year than could be obtained if no mowing were done.

The alternative method to mowing is to allow the excess spring growths to mature in the fields, and be left for stock to graze in the dry state. Whilst this dry feed has a value which is comparatively good in some cases, such as where a lot of ripened clover seed is available for stock, it is wasteful. Experience shows that livestock prefer good cured meadow hay to this dried up pasture, a lot of whose nourishment has been lost to animals, through valuable ingredients being leached from it by the actions of sun and rain. It contains a high percentage of fibre and indigestible matter



which is not readily assimilated. Hence, though it is a food that will maintain stock, and possibly fatten grown animals, it is of little use to milk producers. Good meadow hay, on the other hand, contains good nourishment, readily available, and is highly valuable for milk producing stock.

The use of the mower is also advantageous in removing or reducing grasses or plants that are more or less obnoxious, such as Sterile Brome, Silver, and Barley grass, that have troublesome grass seeds. These, when mown in an immature state and carted from the field, have less chance of reproducing so thickly, and thereby give the better grasses a greater opportunity to develop.

In conclusion, allow me to repeat three important factors relative to the management of pastures:—

1. Sow a mixture of grasses and clover seeds of proved vitality and suitable to your local soil and climatic conditions, and when sowing, give them every opportunity to thrive, similar as would be given to cereal crops.

2. Apply liberal dressings of fertiliser, at least 90lbs. 45 per cent. superphosphate annually.

3. Adopt a methodical system of grazing so that portions of the pasture fields are not over-grazed to the detriment of other portions.

An address, "The Clydesdale Horse," which was illustrated with lantern slides, was given by Mr. F. H. Francis, President of the South Australian Branch of the Clydesdale Horse Society.

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#### Tuesday Afternoon.

#### CODLIN MOTH EXPERIMENTS.

The following paper was read by Mr. R. FOWLER, Manager of the Blackwood Experimental Orchard:—

During the past few years, since restrictions were placed by the English authorities on the importation of apples or other fruits carrying arsenical spray residue exceeding 0.01 grains per lb. of fruit, many efforts have been made to find means of control other than the use of arsenical compounds, more particularly in the last two or three sprays prior to harvesting, and of recent years the use of oils, particularly the so-called "white oils," has been brought rather prominently under the notice of growers.

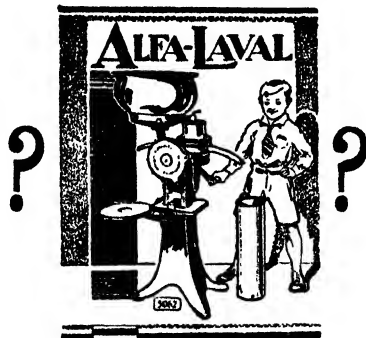
Extensive experiments have been carried out in America and South Africa, as well as in New South Wales and Victoria, with more or less success, though with different conclusions. As the matter is one of great interest to growers, both from the point of view of the more efficient control of the codlin and the elimination from the cost of production of the heavy expense involved in wiping or otherwise removing the excess arsenical residue, the Chief Horticultural Instructor decided to initiate a number of experiments at the Blackwood Orchard with a view to testing, under local conditions, the use of "white oils" as possible ovicides in the control of codlin moth. It was also decided at the same time to test the relative effectiveness of the imported American oil known as "Volck," and an Australian production put on the market by Cooper Nephews' Ltd., under the name of "Alboleum," especially as the latter holds the advantage of being from 1s. to 1s. 6d. a gallon cheaper than the former.

In the previous season, 1928-29, when there was a very light crop of fruit, the infestation of codlin moth was very severe, being as high as 47 per cent. in some of our plots under the ordinary spraying programme of five sprays with Lead Arsenate. From the number of grubs caught in the bandages, where these were used in the spraying experiments last season, it seemed very probable that there would be a large carry-over of caterpillars to start a heavy Spring infestation this



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season, but for some unexplained reason this was not so, if we may judge from the number of moths caught in the bait traps at the beginning of the season 1929-30. It would also seem as if some unknown parasite, or fungus, was responsible for the destruction of a large number of the over-wintering caterpillars. Whatever may have been the controlling factor, the fact remains that the codlin moths were not nearly so numerous in the early part of the season, judging from the numbers caught in the bait traps, as they were in the previous season, when we had a light crop of fruit for them to attack.

#### GENERAL NATURE OF CONTROL TESTS.

Seventeen spraying tests were carried out this year. They were designed with the idea of determining the most effective and economical method of dealing with codlin control under identical orchard conditions, and at the same time to find out if the oil treatment would prove efficacious, both in the control of the codlin and in the elimination of the arsenical residue from the fruit at harvest time. The tests included:—

1. Arsenate of lead and fluxit spreader.
2. Arsenate of lead and Summer oils combined.
3. Summer oil alone.
4. Arsenate of lead, two sprays, viz., one calyx and one cover, followed by three Summer oil sprays.
5. Arsenate of lead, two calyx sprays, followed by three Summer oil sprays.
6. Arsenate of lead without spreader.
7. Arsinette, which is claimed to be a combined Arsenate of lead and spreader mixture, two sprays followed by three Summer oil sprays.
8. Arsenate of lead with and without a calyx spray; and
9. The application of arsenical dusts.

Each test received five applications of spray with the exception of the test where the calyx spray was omitted, and in the dusting experiment, owing to the extreme difficulty of getting suitably calm weather, it was only possible to give four applications of dust. On all four occasions, however, the weather conditions were favorable for doing efficient work. The last application of spray was given on the 29th January. The intention was to have applied a still later spray had general conditions and evidences of codlin activity demanded it, but it was found very difficult to get the spraying outfit between the rows, owing to the spread of the limbs caused by the heavy crops the trees were carrying. From the small number of moths being caught in the bait traps in early February, and the absence of apples on the trees showing codlin injury, it appeared there was not much moth activity, and it was finally decided to omit it. From the results obtained it would certainly seem that another application of spray would not have been warranted, and would, in the season under review, have been a waste of time and material.

All applications of spray were made by the Writer himself, assisted by an experienced orchard hand, and every care was taken to perform the work as thoroughly as possible, both outside and inside the trees, which were good standard types for the Variety, each carrying approximately 8 to 10 cases of fruit, and in a few instances 14 to 20 cases. The ordinary orchard motor spray pump was used, and the ordinary "Friend" nozzle was substituted for the spray pistol to enable the operator to exercise a better control in the direction of the spray material. The amount of spray used—approximating to 2galls. per tree—was sufficient to thoroughly wet all portions of the tree. A pressure of from 175-200lbs. per square inch was maintained, and the spray was applied as a fairly coarse mist.



### TIME OF APPLYING SPRAYS.

The first, or calyx, spray was applied when practically all the petals had fallen from the flowers, but the calyx lobes were still open. Where two calyx sprays were given an interval of one day was allowed between the sprays. The first cover spray was applied 10 days after the calyx spray. Experience of trapping moths over a period of five years has proved that the majority of Spring brood moths are on the wing about this stage of the fruit setting. The timing of the other cover sprays was determined by the emergence of moths as indicated by the numbers being caught in the bait traps, and by similar data obtained during previous seasons. It is generally considered essential that cover sprays should be applied just prior to or immediately after the time when most moths are on the wing. A reference to the graph on page 10 will indicate these assumed periods of greatest danger.

### VARIETIES OF APPLES IN THE TESTS.

The experiments were carried out on the standard varieties of Apples used in export, and included Cleopatra, Jonathan, Dunn's Seedling, Rome Beauty, Esopus Spitzenberg, and Scarlet Nonpareil. Most of the tests consisted of from 8 to 12, or, in a few instances, more trees, mostly carrying from 6bush. to 12bush. of fruit, but in a few instances 14bush. to 20bush. Tests G and H were carried out on trees that have never been pruned, and consequently of very dense growth, but in all other tests the trees have been regularly pruned, and were of good, open-framed standard types. All trees in the Test plots were bandaged. The bandages were examined carefully every 7 to 10 days, and all grubs under them counted and destroyed. The record of grubs trapped is shown in following Table I.:

TABLE I.—*Record of Codlin Grubs Caught in Bandages, 1929-30.*

[illegible]



When a fairly large number of tests are being carried out, it is necessary to limit the number of Trees in each test to enable the applications to be made as near the proper time as possible with the facilities available, and in the tabulating of results, though the margin of error may be greater owing to the carry-over infestation from adjoining trees, it is, in our opinion, preferable in the final check up of results for the percentages to be computed from the actual crop taken from each tree in the test rather than from a portion of the crop from each tree, or from a selected number of trees in each test. A close study of individual tree records shows a wide variation of infestation under the same treatment, and where different varieties are included in the test, the same difficulty occurs, as the degree of infestation in the different varieties has been found to vary greatly. In test F., for instance, Cleopatras showed 7.51 per cent.; Dunn's, 4.74 per cent.; Jonathan, 2.96 per cent.; and Scarlet Nonpareil, 0.06 per cent. of infestation.

Owing to the abnormal weather conditions, the harvesting season under review was unusually extended, and it was feared that this might to some extent interfere with the results, as there was a danger, owing to the very dry conditions prevailing, that the later fruits would be exposed to infestation from a possible third brood of moths. This was not the case, however, and it is our opinion that the results obtained fairly accurately indicate the merits or demerits of the sprays used.

#### CODLIN MOTH TRAPPING RECORDS FOR 1929-30.

The first traps (six in number) were put out on September 30th in a block of pears close to the Office, and the first moths were caught on October 24th. The 48 traps from which the moth data for the season were taken were then put out and examined every seven days until March 10th. As previously stated, the catch was comparatively light right throughout the season. The Spring brood emerged in greatest numbers between October 27th and November 4th. Approximately five weeks later the first brood of moths appeared and fair numbers were caught in the traps, and again about six weeks later, February 3rd to 10th, the second brood moths appeared and were fairly numerous up to March 3rd. The lures used this season were a solution of molasses, 1 in 3 of water, fermented apple juice diluted with an equal volume of water, and a mixture of fermented apple and pear juice similarly diluted.

The best results were obtained with the molasses solution, and, as noted in previous years, this solution is far less destructive to beneficial insects, such as Ladybirds and Lacewing flies. The strength of this mixture has been maintained at 1-3, but we lean to the opinion that it could be reduced to 1 in 10 and still prove equally effective. It has the advantage over other lures in that it is readily procurable and can be always kept on hand.

A feature of the trapping this season has been the enormous number of boll worm moths of various species caught in the traps, particularly in the early part of the season, when it was a common occurrence to take 20 or more such moths from each trap. It is quite possible that their presence to some extent offered obstruction and thus interfered with the entry of the codlin moths into the traps. Examination of the codlin moths caught again showed, as in previous seasons, that about 50 per cent. were females, and of the females examined some were found to contain eggs, while others showed no signs of gravidity.

A previous experience seemed to show that where a few traps were used in a small portion of the orchard, the percentage of codlin injury was not less than where no traps were used. It was therefore assumed that the traps used in Tests A., B., C., and D. would not interfere in any way with the comparative value of the Tests, and the correctness of this assumption is seemingly supported by the results. The results of trapping Moths will be found in the following Table II.



TABLE II.  
*Codlin Moth Trapping Tests, Blackwood, 1929-30.*  
 First and second sprays—  
 October 20th, 21st, 23rd, and 31st.  
 In manure Tests on Cleopatra  
 Apple Trees.

| In manure Tests on Cleopatra Apple Trees. |                            |                   |             |                            |                   |             |                            |                   |             |                                           |                   |             |                                            |                                         |                                  |      |
|-------------------------------------------|----------------------------|-------------------|-------------|----------------------------|-------------------|-------------|----------------------------|-------------------|-------------|-------------------------------------------|-------------------|-------------|--------------------------------------------|-----------------------------------------|----------------------------------|------|
| Row 1 (east to west.)                     |                            |                   |             | Row 2.                     |                   |             |                            | Row 3.            |             |                                           |                   | Row 4.      |                                            |                                         |                                  |      |
| Date Examined.                            | Molasses Solution, 1 in 3. |                   |             | Molasses Solution, 1 in 3. |                   |             | Apple Juice, 50% Solution. |                   |             | Apple and Pear Juice Mixed, 50% Solution. |                   |             | Total Catch of Light-brown Moths, 48 Jars. | Total Catch of Lace-wings from 48 Jars. | Average Catch of Codlin per Jar. |      |
|                                           | Codlin Moth.               | Light-brown Moth. | Lace-wings. | Codlin Moth.               | Light-brown Moth. | Lace-wings. | Codlin Moth.               | Light-brown Moth. | Lace-wings. | Codlin Moth.                              | Light-brown Moth. | Lace-wings. |                                            |                                         |                                  |      |
| 1929.                                     |                            |                   |             |                            |                   |             |                            |                   |             |                                           |                   |             |                                            |                                         |                                  |      |
| Nov. 4                                    | 41                         | —                 | 39          | 30                         | —                 | 11          | 32                         | 5                 | 49          | 49                                        | 10                | 70          | 152                                        | 15                                      | 169                              | 3-17 |
| " 11                                      | 1                          | 2                 | —           | —                          | —                 | 1           | 2                          | 1                 | 12          | 7                                         | —                 | 7           | 10                                         | 3                                       | 20                               | 0-2  |
| " 18                                      | 22                         | 3                 | 3           | 12                         | —                 | 1           | 10                         | 2                 | 8           | 8                                         | 3                 | 24          | 52                                         | 8                                       | 36                               | 1-08 |
| " 25                                      | 12                         | —                 | 5           | 10                         | 2                 | 1           | 7                          | 2                 | 3           | 8                                         | —                 | 6           | 37                                         | 4                                       | 15                               | 0-77 |
| Dec. 2                                    | 20                         | 7                 | 9           | 4                          | —                 | 3           | 13                         | 1                 | 7           | 14                                        | 1                 | 9           | 51                                         | 9                                       | 28                               | 1-06 |
| " 9                                       | 37                         | 1                 | 6           | 18                         | 1                 | 2           | 23                         | 1                 | 11          | 21                                        | —                 | 20          | 99                                         | 3                                       | 39                               | 2-06 |
| " 16                                      | 1                          | —                 | 3           | 2                          | —                 | 1           | 1                          | —                 | 1           | 3                                         | 3                 | 1           | 7                                          | 3                                       | 6                                | 0-15 |
| " 23                                      | 22                         | 7                 | 7           | 8                          | 4                 | 5           | 6                          | —                 | 10          | 7                                         | 1                 | 8           | 43                                         | 12                                      | 30                               | 0-89 |
| 1930.                                     |                            |                   |             |                            |                   |             |                            |                   |             |                                           |                   |             |                                            |                                         |                                  |      |
| Jan. 6                                    | 21                         | 22                | 11          | 15                         | 11                | 7           | 11                         | 2                 | 14          | 11                                        | 4                 | 14          | 58                                         | 39                                      | 46                               | 1-21 |
| " 13                                      | 17                         | 4                 | 6           | 15                         | 3                 | 3           | 3                          | 6                 | 17          | 16                                        | 3                 | 21          | 51                                         | 16                                      | 47                               | 1-06 |
| " 20                                      | 4                          | 7                 | 1           | 4                          | 3                 | —           | 11                         | 4                 | 3           | 6                                         | 7                 | 13          | 25                                         | 21                                      | 17                               | 0-52 |
| " 27                                      | 13                         | 31                | 12          | 4                          | 22                | —           | 2                          | 4                 | 2           | 8                                         | 3                 | 2           | 27                                         | 60                                      | 16                               | 0-56 |
| Feb. 3                                    | 49                         | 35                | 7           | 54                         | 29                | 1           | 19                         | 17                | 6           | 35                                        | 5                 | 7           | 157                                        | 86                                      | 21                               | 3-27 |
| " 10                                      | 49                         | 21                | 9           | 30                         | 17                | 4           | 12                         | 4                 | 1           | 51                                        | 9                 | 1           | 142                                        | 51                                      | 15                               | 2-96 |
| " 17                                      | 24                         | 14                | 2           | 30                         | 6                 | 3           | 5                          | 2                 | —           | 16                                        | 7                 | 1           | 75                                         | 29                                      | 6                                | 1-56 |
| " 24                                      | 38                         | 5                 | 6           | 34                         | 5                 | 3           | 18                         | 3                 | 6           | 18                                        | 3                 | 8           | 108                                        | 16                                      | 23                               | 2-25 |
| Mar. 3                                    | 45                         | 4                 | 1           | 46                         | 16                | —           | 13                         | —                 | 1           | 34                                        | 4                 | 1           | 138                                        | 24                                      | 3                                | 2-87 |
| " 10                                      | 15                         | 3                 | 2           | 12                         | 6                 | —           | 4                          | 4                 | —           | 3                                         | 1                 | —           | 34                                         | 14                                      | 2                                | 0-71 |
|                                           | 431                        | 166               | 129         | 328                        | 125               | 46          | 192                        | 58                | 151         | 315                                       | 64                | 213         | 1,266                                      | 413                                     | 539                              | —    |



## RESULTS OF SPRAYING TESTS.

All records were made by the writer with the capable assistance of N. R. Quinn (Assistant Orchardist at Blackwood), and a reliable member of the staff.

In calculating the percentage of codlin affected fruit, all fruit produced on the trees was examined carefully, including windfalls, which were gathered from time to time. Owing to the amount of work involved in attempting to arrive at a percentage by counting of infested fruits this method had to be abandoned in favor of a record for weight. This method we consider gives a fairly accurate idea of the wastage. No separate record was made to indicate whether the codlin had entered through the calyx or through the side, but it was an outstanding feature in the past season that most, if not all, the affected fruits had been injured by the larvae of the first brood moths, there being almost a complete absence of the second brood of caterpillars usually found freely entering the apples at picking time.

The fact that later varieties and even some fruits of early ripening varieties that were left on the trees owing to lack of size till the end of May showed practically no signs of infestation by this brood would seem to indicate that it did not appear in anything approaching its usual numbers. It would seem then that a large proportion of the first and probably most of the second brood grubs did not transform this season, and that fact may possibly offer an explanation should a very abundant first brood appear next season.

## ARSENATE OF LEAD AND VOLCK OIL TESTS.

## DISCUSSION OF RESULTS.

In Test A. arsenate of lead with fluxit added to the last three sprays was used; in Tests B. and C. arsenate of lead twice, Volck Oil three times; and in Test D. arsenate of lead in combination with Volck Oil; in Test B1 Volck Oil alone was used. From one year's records it would seem that the arsenate and oil mixture gave the best results from the codlin control point of view, only 0.61 per cent. of fruit by weight being rejected. From the viewpoint of arsenical spray residue, though analyses showed 5.1 grains of arsenic per pound, the fruits were badly covered and would all require cleansing. Test B1., Volck Oil alone, gave very good results from the control point of view, but the general appearance of the fruit (Jonathan), particularly as to color, seemed to be marred by the continual application of Volck Oil. This may have been due to the abnormal weather conditions, as practically no rain fell after December, and the oil seemed to hold the dust on the trees and fruit. The coloring was blotched and streaky and detracted very much from the general appearance of the Jonathan apples.

In Tests B. and C. two arsenate and three Volck Oil sprays, Test C., where the arsenate was used as two calyx sprays, gave slightly better results than Test B, which received a calyx and first cover spraying 10 days later. This result seems to emphasise the necessity for the calyx spray being done very thoroughly.

In Test A., where arsenate of lead alone was used for the first two sprays, and with 1lb. fluxit per 100galls. added to the last three sprays, the result could be considered quite satisfactory, the percentage of codlin being only 4.88 as against 5.43 and 3.85 in Tests B. and C. Analyses showed a much higher percentage of arsenical spray residue than the tolerance allowed in England and all these fruits required wiping or washing before packing.

It would seem, then, while Arsenate of lead alone and arsenate and oil mixtures gave good results, the arsenical spray residue adhering to the fruits was excessive. That two arsenate and three oil sprays will give good results as regards codlin control, and that the percentage of spray residue is considerably reduced in comparison with the preceding treatments. There was evidence of slight oil injury to a few fruits, but the loss was negligible. As in Test B1., the oil seemed to hold the dust on the fruit and trees, and to some extent the general appearance of the



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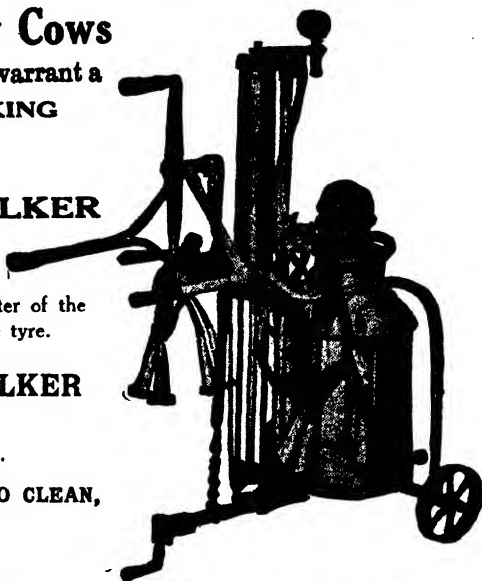
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fruit was marred. This might not occur in a year of average rainfall during the summer months. That oil alone applied five times will control codlin moth, but appears to injure the appearance of the fruit, particularly of colored sorts.

#### ARSENATE OF LEAD AND ALBOLEUM OIL.

These Tests E., F., G., and H. were a repetition of A., B., C., and D. with this difference, that Alboleum was used instead of Volck Oil, and the results were much the same. The lowest per cent. of codlin injury was in Test H., sprayed with the arsenate and oil in combination, but the arsenical residue was again higher than the British tolerance. Arsenate of Lead, two calyx sprays, followed by three oil gave slightly better results than a calyx and first cover followed by three oil sprays, and arsenate of lead with fluxit added also gave good results, but again the arsenical residue was excessive. In the comparison between Volck and Alboleum as possible ovicides for codlin control, Volck seems to have a very slight advantage, but so small as to be almost negligible, so that it can reasonably be inferred that the Australian product is equally as effective as the imported, viewed as a preventer of Codlin infection whatever its action may ultimately be proved to be.

In these tests four varieties of apples were used, and it is interesting to note that of the four varieties—viz., Cleopatra, Dunn's Seedling, Jonathan, and Scarlet Nonpareil—the Cleopatra used in these trials was shown to be the most susceptible to codlin injury, then Dunn's, followed by Jonathan, and lastly Scarlet Nonpareil; the latter variety being hardly attacked at all. It would be interesting to know the results obtained by other experimenters in this respect. There was slight evidence of oil injury as with the Volck, but only in a very few instances, and the appearance of the fruit generally was very good and clean.

Tests G. and H. were carried out on densely branched, unpruned trees, carrying heavy crops, but the results were equally as good as with the pruned trees.

#### TESTS WITH ARSENATE OF LEAD ALONE AND WITH SPREADER ADDED.

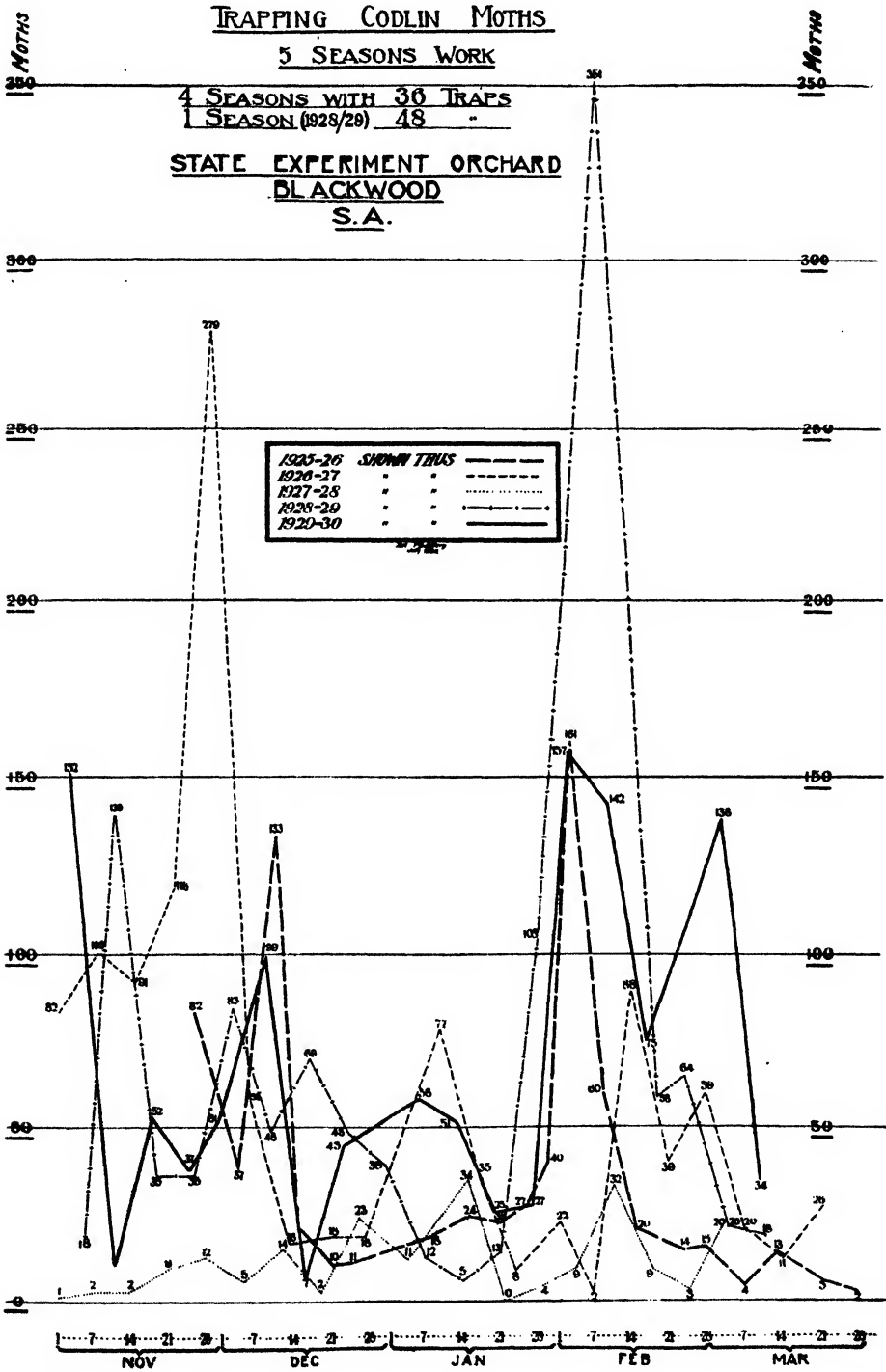
Results of Tests I. and J., with arsenate alone and with spreader (fluxit) added to the last three sprays, seems to indicate that some advantage was derived from the use of fluxit, but this cannot, in our opinion, be taken as a definite conclusion from the results of one year's work, as previous tests with casein spreaders over four years did not show any particular benefit from their use.

W. S. Regan, of the Research Department of the California Spray-Chemical Company, in his 1929 experiments found that Arsenate of Lead used alone had a slight advantage from the standpoint of control over Lead and Fluxit, and he concluded from the fact that in the Lead Fluxit combination test there was much increased worm work towards the end of the season, when spraying had ceased, that the combination, although building up a heavy coverage at the time when application is made, it weathers or flakes off more rapidly than is probably the case with the lead when used alone. In our tests this season we were only able to use the fluxit in the last three sprays, as the material did not come to hand in time for the calyx and the first cover spray. We hope to carry out further tests this coming season. No special analyses were made of the arsenical residue at picking time, but in both tests most of the fruit required wiping before packing.

#### TESTS BETWEEN ARSINETTE AND ARSENATE OF LEAD WITH FLUXIT COMBINATION.

Arsinette, which is claimed to be Arsenate of Lead in which the spreader is incorporated with the lead, is made in Australia by Cooper Nephews. Fluxit is a spreader manufactured in America. The result of the test seems to be in favor of arsinette, Cleopatras showing only 3.14 per cent. of Codlin in Test L. as against 6 per cent. in Test K., and Esopus Spitzenberg 4.92 per cent. as against 9.72 per cent. Arsinette mixes very readily, but violent agitation as, for instance, the propeller type used in some spray pumps causes it to froth up badly.







### TESTS WITH ARSINETTE AND ALBOLEUM OIL v. ARSENATE OF LEAD WITH FLUXIT AND VOLCK OIL.

In Tests M. and A. Arsinette and Alboleum gave slightly better results than the Arsenate of Lead-Fluxit and Volck, Cleopatra showing only 3.9 per cent. of codlin as against 4.88 per cent.; but as there were only two trees under treatment in Test M. as against 12 in Test A., there can be no fair conclusion reached. Arsinette and Alboleum Test M. also gave slightly better results than the Lead and Fluxit and Alboleum. Test F., Cleopatra showing 3.9 per cent. codlin as against 4.66 per cent., Jonathans 3.23 per cent. as against 4.86 per cent.; analyses for spray residue showed 1.05/100 grains in Test F., no analyses for spray being made in Test M., but the apples showed practically no signs of spray residue when packed. Slight traces of oil injury were noticed on a few fruits, but very little damage resulted.

### TESTS WITH ARSENICAL DUST AS AGAINST WET ARSENICAL SPRAY.

The 1929-30 tests again demonstrated, as in the previous four years, that dusting for codlin moth control did not give the same satisfactory results as the wet spray. Test N., dusted four times, showed 16.31 per cent. of codlin injured fruit. Test O., sprayed four times, 6.66 per cent.; and Test P., sprayed five times, 5.12 per cent. Analyses for spray residue showed slightly in favor of dust, viz., 0.95/100 grains as against 1.04/100 grains per lb. It is generally considered that effective control of codlin moth by means of sprays depends on the spray programme being carried out at the right time, and as dusting is dependent so much more than wet spraying on weather conditions, it is here where the greatest difficulty comes in. Last season it was difficult to get a calm day at the right time, and it was time for the third dusting before we got the second on, though on the actual days when the dusts were applied conditions on the whole were favorable for a proper distribution of the testing material.

The omission of the calyx spray in Test O. would seem to have resulted in a slight increase in codlin injury, 6.66 per cent. as against 5.12 per cent. where the calyx spray was applied. This result, not very convincing, coincides with previous experience.

### COMPARATIVE COSTS OF SPRAYS.

In the production costs of a case of Apples, spraying is a very large item, and the cost of spraying material has to be carefully considered before a change of spray programme can be considered. In the following Table an attempt is made to show the approximate costs connected with this year's tests in regard to material only:—

|                                                                                      |                  |
|--------------------------------------------------------------------------------------|------------------|
| 100galls. spray, using 4lbs. lead to 100galls., with lead at 10d. costs              | 3s. 4d. per 100. |
| 100galls. spray, using 2galls. Volck to 100galls., with Volck at 8s. 6d. costs       | 17s. per 100.    |
| 100galls. spray, using 2galls. Alboleum to 100galls., with Alboleum at 7s. 6d. costs | 15s. per 100.    |

It will be noticed from the Table following that there was little difference in the loss per acre from the use of five sprayings with arsenate of lead alone and arsenate twice and oil three times, but a great difference in the cost of material per acre. Against this must be placed the cost of wiping or washing the apples before packing, a costly operation running into 3d. or 4d. a case approximately.

In D. and H. the losses per acre were considerably reduced, but at such a high cost for spraying material that the benefit derived was more than lost again without, in this case, any advantage as regards spray residue, but rather the reverse is true, as the lead arsenate and oil combined not only showed more residual arsenic than arsenate alone, but the combination was much harder, if not actually impossible, to remove by ordinary wiping methods.



TABLE III.—*Showing Details of Spray Material Costs.*

| Description of Spray.                                                        | Relative Cost per Test on 100-gall. Basis, Sprayed Five Times. | Relative Cost per Acre Sprayed Five Times with 150galls. Spray at each Application. | Cost per Case of Fruit Calculated at 300 Cases per Acre. | Loss Due to Codlin Injury as shown by Results. | Loss per Acre due to Codlin, Calculated at 3s. per Case, at 300 Cases per Acre. |
|------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------|
|                                                                              | £ s. d.                                                        | £ s. d.                                                                             | d.                                                       | %                                              | £ s. d.                                                                         |
| A. Arsenate of Lead, 5 times, 1 in 25 .....                                  | 0 16 8                                                         | 1 5 0                                                                               | 1                                                        | 4.88                                           | 2 3 11                                                                          |
| B. Arsenate of Lead twice, 1 in 25; Volck Oil 5 times, 1 in 50. ....         | 2 17 8                                                         | 4 6 6                                                                               | 3.46                                                     | 5.43                                           | 2 8 10½                                                                         |
| F. Arsenate of Lead twice, 1 in 25; Alboleum Oil 3 times, 1 in 50. ....      | 2 11 8                                                         | 3 17 6                                                                              | 3.1                                                      | 4.92                                           | 2 4 3                                                                           |
| D. Arsenate of Lead, 1 in 25; combined with Volck, 1 in 80, 5 times          | 3 10 0                                                         | 5 5 0                                                                               | 4.2                                                      | 6.61                                           | 0 5                                                                             |
| H. Arsenate of Lead, 1 in 25; combined with Alboleum, 1 in 80, 5 times ..... | 3 3 6½                                                         | 4 15 4                                                                              | 3.81                                                     | 1.56½                                          | 0 14 2½                                                                         |

## SUMMARY OF RESULTS FOR SEASON 1920-30.

To sum up, it would seem that from one year's results:—

1. That this season arsenate of lead with the addition of fluxit in last three sprays gave very satisfactory results.

2. That arsenate of lead alone was only slightly less satisfactory than arsenate of lead and fluxit.

3. That arsenate of lead, two calyx sprays and/or calyx and first cover, followed by three oil sprays, using either Volck or Alboleum, gave good results and reduced the arsenical residue trouble.

4. That the best results from the standpoint of codlin control were obtained by the use of the lead arsenate and oil combination, but that the present costs of these spraying oils seem to be almost prohibitive.

5. That the lead arsenate and oil combinations when mixed before spraying left the highest per cent. of arsenical residue per pound of fruit, and that it was found most difficult to remove.

6. That the lead arsenate and oil combinations probably owe their extra efficiency to the fact that they make a heavy coverage on the fruit, which is not readily washed off by rain or rubbed off by wind action.

7. That a slight injury to the fruit follows the use of Volck and/or Alboleum, but that the damage is not serious.

8. That Volck oil alone will control codlin moth, but that it seems to inhibit to some extent the color formation of the skins of red apples and causes a certain amount of rustiness, thereby detracting considerably from the general appearance of the fruit.

9. That from the viewpoint of effectiveness in codlin control, Alboleum may be expected to give just as satisfactory results as Volck.

10. That "Arsinette" alone gave very good results, but a suspicious amount of what may be arsenical residue was noticeable on the fruit at packing time.

11. That in a dry season like the one just experienced, applications of oil tend to collect the dust on foliage and fruit to the detriment of both.

12. That arsenical dusts do not seem to give satisfactory results in codlin control.

13. That it is not advisable to omit the calyx spray.

14. That, on the whole, in the apple growing areas in this State, there was a heavy crop of fruit with a naturally light infestation of codlin moth during the season under review.

Data in connection with control tests is given in detail in the following Table IV.



TABLE IV.—Detailed Results of 1929-30 Spraying Tests for Codlin Moth, Blackwood.

| Test O Variety.                                                                   | Spray Schedule.                                                                                                                                      | Dates Applied. | Total Crop per Test, in Lbs. | Average Crop in Tree in each Test. | Total Weight of Apples with Codlin String or Grubs per Test. | Average Weight per Tree of Apples with Codlin String or Grubs. | No. of Codlin Larvae Caught in Bandages per 100 lbs. of Fruit. | No. of Moths Trapped in Test. | No. of Codlin Grubs Caught in Bandages per Test. | Per Cent. of Codlin per Test. | Grains of Arsenic, AS <sub>4</sub> O <sub>6</sub> , per Lb. of Apples. |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------|------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|-------------------------------|--------------------------------------------------|-------------------------------|------------------------------------------------------------------------|
| A<br>12 Cleopatra ...                                                             | Arsenate of lead powder, 1 lb. in 25 gallons water, 5 times; 1st and 2nd sprays without flunit spreader, 3rd, 4th, and 5th with 1 lb. to 100 gallons | 21/10/29       | 2,860½                       | 238.4                              | 139½                                                         | 11.6                                                           | 5.8                                                            | 372                           | 166                                              | 4.88                          | 0.0267                                                                 |
|                                                                                   |                                                                                                                                                      | 31/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 26/11/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| B<br>12 Cleopatra ...                                                             | Arsenate of lead powder, 1 in 25 gallons water, twice; Calyx and first cover Volck oil, 1ga 1/2 in 50, 3 times                                       | 21/10/29       | 3,135                        | 261.25                             | 170½                                                         | 14.19                                                          | 5.52                                                           | 304                           | 173                                              | 5.43                          | 0.0089                                                                 |
|                                                                                   |                                                                                                                                                      | 31/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 26/11/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| B1<br>12 Jonathans...                                                             | Volck oil, 1 in 40 for 1st and 2nd spray; 1 in 50 for 3rd, 4th, and 5th sprays                                                                       | 23/10/29       | 1,890½                       | 157.56                             | 34½                                                          | 2.9                                                            | 7.14                                                           | No traps used                 | 135                                              | 1.82                          | —                                                                      |
|                                                                                   |                                                                                                                                                      | 26/11/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 16/12/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| C<br>12 Cleopatra ...                                                             | Arsenate of lead powder, 1 in 25, twice; 2 Calyx sprays; Volck oil, 1gal. in 80, 5 times                                                             | 21/10/29       | 2,848½                       | 237.37                             | 109½                                                         | 9.15                                                           | 3.97                                                           | 175                           | 113                                              | 3.85                          | 0.005                                                                  |
|                                                                                   |                                                                                                                                                      | 23/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 26/11/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| D<br>12 Cleopatra                                                                 | Arsenate of lead, 1 lb. in 25galls., blended with Volck oil, 1gal. in 80, 5 times                                                                    | 21/10/29       | 2,224½                       | 185.35                             | 13½                                                          | 1.13                                                           | 1.39                                                           | 320                           | 31                                               | 0.61                          | 0.051                                                                  |
|                                                                                   |                                                                                                                                                      | 31/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 27/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| E<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Jonathans...<br>2 Scarlet Non-<br>pareil | Arsenate of lead powder, 1 lb. in 25 gallons, 5 times; 1st and 2nd spray without flunit spreader, 3rd, 4th, and 5th with 1 lb. flunit to 100galls.   | 22/10/29       | 861½                         | 430.87                             | 64½                                                          | 32.37                                                          | —                                                              | —                             | 42                                               | 7.51                          | —                                                                      |
|                                                                                   |                                                                                                                                                      | 31/10/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
|                                                                                   |                                                                                                                                                      | 26/11/29       |                              |                                    |                                                              |                                                                |                                                                |                               |                                                  |                               |                                                                        |
| Totals per Test .....                                                             |                                                                                                                                                      |                | 3,001½                       | 375.22                             | 132½                                                         | 16.59                                                          | 3.2                                                            | No traps used                 | 96                                               | 4.42                          | 0.0258                                                                 |



**TABLE IV.**—*Detailed Results of 1929-30 Spraying Tests for Codlin Moth, Blackwood—continued.*

| Test O Variety.                                                                   | Spray Schedule.                                                                                                                                             | Dates Applied.                                          | Total Crop per Test, in Lbs.                               | Average Crop in Tree in each Test.                             | Total Weight of Apples with Codlin Storing or Grubs per Test. | Average Weight per Tree of Apples with Codlin Grubs or Fruit. | No. of Codlin Larvae Caught in Bandages per 100lbs. of Fruit. | No. of Moths Trapped in Test.   | No. of Codlin Grubs Caught in Bandages per Test. | Per Cent. of Codlin per Test.                    | Grains of Arsenic, AS4O6, per lb. of Applcs. |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------|
| F<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Jonathans ...<br>2 Scarlet-Non-patel ... | Arsenate of lead powder, 1lb. in 25 gallons, 2 sprays; Calyx and 1st cover Cooper's Alboeum oil, 3 sprayings, 1gal. in 50galls.<br><br>Total per Test ..... | 22/10/29<br>31/10/29<br>24/11/29<br>17/12/29<br>29/1/30 | 1,095½<br>983½<br>714½<br>458½<br>—                        | 547·75<br>490·87<br>357·25<br>229·25<br>—                      | 51<br>66½<br>34½<br>7½<br>—                                   | Lbs.<br>25·5<br>33·12<br>17·37<br>3·87<br>—                   | —<br>—<br>—<br>—<br>—                                         | —<br>—<br>—<br>—<br>—           | 37<br>36<br>19<br>31<br>—                        | 4·66<br>6·76<br>4·86<br>1·69<br>—                | —<br>—<br>—<br>—<br>—                        |
| G<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Jonathans ...<br>2 Scarlet-Non-patel ... | Arsenate of lead, 1lb. in 25galls., 2 Calyx sprays; Cooper's Alboeum oil, 3 sprayings, 1gal. in 50<br><br>Total per Test .....                              | 22/10/29<br>28/10/29<br>26/11/29<br>17/12/29<br>29/1/30 | 807½<br>1,310<br>858½<br>567<br>—                          | 408·75<br>655<br>429·87<br>283·5<br>—                          | 56½<br>73½<br>30<br>12½<br>—                                  | 20<br>28·37<br>36·87<br>15<br>6·25<br>—                       | 3·78<br>—<br>—<br>—<br>—                                      | —<br>—<br>—<br>—<br>—           | 123<br>64<br>43<br>42<br>62<br>—                 | 4·92<br>7·03<br>5·63<br>3·49<br>2·2<br>—         | 0·0105<br>—<br>—<br>—<br>—<br>—              |
| H<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Jonathans ...<br>2 Scarlet-Non-patel ... | Arsenate of lead, 1lb. in 25. blended with Cooper's Alboeum oil, 1gal. in 80galls. water<br><br>Total per Test .....                                        | 23/10/29<br>31/10/29<br>18/11/29<br>18/12/29<br>29/1/30 | 3,543½<br>906<br>453<br>485½<br>735½<br>457<br>2,583½<br>— | 442·91<br>453<br>242·62<br>367·75<br>229·5<br>322·97<br>—<br>— | 173<br>19<br>11½<br>8½<br>2<br>40½<br>—                       | 21·03<br>9·5<br>5·62<br>4·25<br>1<br>5·09<br>—                | 6·10<br>—<br>—<br>—<br>—<br>1·5<br>—                          | —<br>—<br>—<br>—<br>—<br>—<br>— | 216<br>21<br>10<br>2<br>6<br>39<br>—             | 4·88<br>2·1<br>2·32<br>1·16<br>0·44<br>1·58<br>— | 0·0133<br>—<br>—<br>—<br>—<br>—<br>—         |
| I<br>2 Jonathans ...<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Romes ...             | Arsenate of lead, 1lb. in 25galls., 5 times; 1st and 2nd spray without fluit, 3rd, 4th, and 5th with fluit, 1lb. to 100galls.<br><br>Total for Test .....   | 23/10/29<br>31/10/29<br>26/11/29<br>18/12/29<br>29/1/30 | 1,217½<br>—<br>—<br>—<br>—                                 | 152·16<br>—<br>—<br>—<br>—                                     | 38<br>—<br>—<br>—<br>—                                        | 4·75<br>—<br>—<br>—<br>—                                      | —<br>—<br>—<br>—<br>—                                         | —<br>—<br>—<br>—<br>—           | —<br>—<br>—<br>—<br>—                            | 3·12<br>—<br>—<br>—<br>—                         | —<br>—<br>—<br>—<br>—                        |
| J<br>2 Jonathans ...<br>2 Cleopatra ...<br>2 Dunns ...<br>2 Romes ...             | Arsenate of lead, 1lb. in 25galls., 5 times, without fluit spreaders<br><br>Total for Test .....                                                            | 23/10/29<br>31/10/29<br>26/11/29<br>18/12/29<br>29/1/30 | 3,422<br>—<br>—<br>—<br>—                                  | 427·75<br>—<br>—<br>—<br>—                                     | 243½<br>—<br>—<br>—<br>—                                      | 30·47<br>—<br>—<br>—<br>—                                     | —<br>—<br>—<br>—<br>—                                         | —<br>—<br>—<br>—<br>—           | —<br>—<br>—<br>—<br>—                            | 7·12<br>—<br>—<br>—<br>—                         | —<br>—<br>—<br>—<br>—                        |



TABLE IV.—Detailed Results of 1929-30 Spraying Tests for Codlin Moth, Blackwood—continued.

| Test O Variety.                                                           | Spray Schedule.                                                                                                                                                   | Dates Applied.                                          | Total Crop per Test, in Lbs.                  | Average Crop in Tree in each Test. | Total Weight of Apples with Codlin String or Grubs per Test. | Average Weight of Apples with Codlin String or Grubs. | No. of Codlin Larvae Caught in Bandages per 100lbs. of Fruit. | No. of Codlin Grubs Caught in Bandages per Test. | Per Cent. of Codlin per Test. | Grains of Arsenic, AS4O6, per Lb. of Apples. |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------|------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|-------------------------------|----------------------------------------------|
| <b>K</b><br>14 Cleopatra ..<br>7 Jonathan ..<br>7 Esopus ..<br>Spitznberg | Arsenate of lead Aero Brand, 1 in 25, 5 times, 1st and 2nd spray without spreader, 3rd, 4th, 5th. with fluzit, 1lb. to 100galls.<br><br>Total from 28 Trees ..... | 23/10/29<br>1/11/29<br>27/11/29<br>16/12/29<br>28/1/30  | 3,261<br>232.93<br>128.64<br>144.68<br>5,174½ | 195½<br>29<br>98½                  | 13.98<br>4.78<br>4.14<br>14.07<br>11.54                      | 478<br>—<br>—<br>—<br>—                               | 156<br>41<br>119                                              | 6.00<br>3.2<br>9.72                              | —                             | —                                            |
| <b>L</b><br>12 Cleopatra ..<br>6 Esopus ..<br>Spitz.                      | Cooper's Arsinette, 1lb. in 25 galls., 5 times<br><br>Total from 18 Trees .....                                                                                   | 23/10/29<br>1/11/29<br>27/11/29<br>18/12/29<br>29/1/30  | 4,501<br>375.08<br>172.54<br>1,035½<br>5,536½ | 141½<br>51<br>72½                  | 11.79<br>8.5<br>10.69                                        | 3.24<br>7.05<br>3.95                                  | 146<br>73<br>219                                              | 3.14<br>4.92<br>3.47                             | —                             | —                                            |
| <b>M</b><br>2 Cleopatra ..<br>2 Jonathan ..<br>2 Esopus ..<br>Spitz.      | Cooper's Arsinette, 1lb. in 25galls., twice, then Cooper's Alboleum, 1 gallon in 50, 3 times<br><br>Total from 6 Trees .....                                      | 23/10/29<br>1/11/29<br>26/11/29<br>17/12/29<br>21/1/30  | 800½<br>400½<br>345.12<br>722½<br>2,235½      | 31½<br>23<br>57½                   | 15.62<br>11.5<br>28.87<br>18.68                              | 3.37<br>2.39<br>6.92<br>4.20                          | 27<br>17<br>50<br>94                                          | 3.90<br>3.23<br>7.99<br>5.01                     | —                             | 0.0096                                       |
| <b>N</b><br>4 Dunns Sdl.                                                  | Dusted 4 times with Arsenical dusts                                                                                                                               | 30/10/29<br>27/11/29<br>19/12/29<br>1/2/30              | 1,007                                         | 251.75                             | 161½                                                         | 41.06                                                 | 21.45                                                         | 216                                              | 16.31                         | —                                            |
| <b>O</b><br>4 Dunns Sdl.                                                  | Calyx spray omitted. Sprayed 4 times with Arsenate of Lead, 1lb. in 25galls., with fluzit in last 3 sprays, 1lb. to 100galls.                                     | 31/10/29<br>26/11/29<br>16/12/29<br>28/1/30             | 949½                                          | 237.31                             | 63½                                                          | 15.81                                                 | 9.69                                                          | 92                                               | 6.66                          | —                                            |
| <b>P</b><br>4 Dunns Sdl.                                                  | Arsenate of Lead, 1 in 25, 5 times, including calyx, with fluzit 1lb. to 100 in last 3 sprays                                                                     | 21/10/29<br>31/10/29<br>26/11/29<br>16/12/29<br>28/1/30 | 869½                                          | 217.37                             | 44½                                                          | 11.13                                                 | 5.18                                                          | 45                                               | 5.12                          | 0.0104                                       |

(To be continued.)



## TOMATO DISEASES IN SOUTH AUSTRALIA AND HOW TO CONTROL THEM

with special reference to Glasshouse Tomato Culture.

[By GEOFFREY SAMUEL, M.Sc., Plant Pathologist, Waite Agricultural  
Research Institute, University of Adelaide.]

[Continued from page 272, *Journal of Agriculture*, October, 1930.]

### BACTERIAL WILT.

*Description.*—Bacterial wilt is sometimes called “white disease” by South Australian growers, on account of the fact that the young green fruit ceases to develop, and becomes rather white, dry, and puffy, and drops off easily. The disease is not common in South Australia. It is most easily



FIG. 14.—Leaf from plant affected with Bacteria Wilt, showing sudden collapse of some leaflets while still green.

recognised by its effect on the leaves. Several leaflets will suddenly commence to shrivel and hang down limp, still retaining their green color, however, while other leaflets on the same leaf may still be perfectly normal (Fig. 14). Often the leaves up one side of a plant will become affected



first. In bad cases the whole plant begins to wilt or droop. If the stalk of an affected leaf be broken across a small amount of a greyish slime may be noticed at the broken end. This sliminess and a brownish discoloration of the wood may be traced right down the stem and into the roots in the later stages.

*Cause.*—The disease is due to bacteria, which may infect the plant through wounds, either on the roots or on stems and leaves. It is the multiplication of these bacteria or germs inside the plant in enormous numbers which forms the slimy substance, blocking up the water-conducting vessels and finally causing a wilt.

The name of the bacterium has not yet been determined for South Australian specimens. In America there are two bacterial diseases of tomatoes, the Brown Rot or Bacterial Wilt (caused by *Bacterium solanacearum*), and the Grand Rapids disease (caused by *Aplanobacter michiganense*). In some respects the South Australian disease resembles the latter more than the former. At the time it was noted, in 1926 and 1927, however, there were no facilities for determining the organism, and in the last two years it has not been seen. If any grower gets plants which he suspects of being infected by this disease, the Waite Institute would be glad if he would send some specimens. Further details on the way in which bacteria cause disease are given on page 255 (October issue).

*Control.*—Once the disease appears in a glasshouse great care should be taken to prevent it preading. The bacteria are such minute living organisms that tens of thousands of them could stick on the fingers after handling a diseased plant. It is advisable to pull out and bury or burn affected plants as soon as seen, and to wash the hands well with soap immediately afterwards. Cease pruning for 10 days to allow plants which may be already infected to show up, and pull out and destroy them as they are seen. Cutting off affected leaves scarcely ever checks the disease, and it is usually preferable to pull the whole plant out straight away. If affected leaves are cut off, the knife, hands, &c., should be washed with soap as before.

In the cases which have occurred in South Australia the disease has not always re-appeared in the same houses the following year. The bacterium causing the disease is not very long lived outside the plant, and the high summer temperatures in Adelaide glasshouses in February when the houses are empty may well have some sterilising effect, especially if the soil is allowed to dry out thoroughly. It would be advisable to give extra careful attention to the destruction of plants at the end of the season, and use fresh soil for next year's seedbeds if an outbreak of the trouble has occurred. Spraying or dusting is of practically no value in checking this disease.

#### “DAMPING-OFF” OF SEEDLINGS.

*Description.*—“Damping-off” is a disease which is very easily recognised. The stem of the young seedling becomes constricted just about ground level, and the affected plant usually topples over, most frequently while the leaves are still healthy and turgid (Fig. 15).

The disease can affect very young seedlings which have only just come up, and sometimes big patches in seedbeds may be seen in which the seedlings have just toppled over and died, especially in cases where the seed has been sown too thickly. At other times pricked-out seedlings



several inches high are attacked, as shown in the illustration. Larger plants are rarely affected. Fortunately, however, tomatoes are not as subject to damping-off trouble as are many other seedlings.

**Cause.**—This disease is caused by a parasitic fungus (*Phytophthora parasitica*, or sometimes other fungi, *Phytophthora cryptogea*, *Pythium*, or *Rhizoctonia*) attacking the stems of the seedlings at ground level. The fungus can live in damp soil, but can also attack seedlings vigorously when the right conditions are present. The conditions which favor the fungus are continuous dampness of the surface soil, warmth, and succulent plant stems such as are produced when seedlings are overcrowded. If seedlings are overcrowded it is also easier for the fungus to grow from one to the other, and the condition of the surface soil remains shaded and moist too long. It is under such conditions that seedlings may go down in dozens, and the infected patches in the seedbeds can be seen growing larger every day.

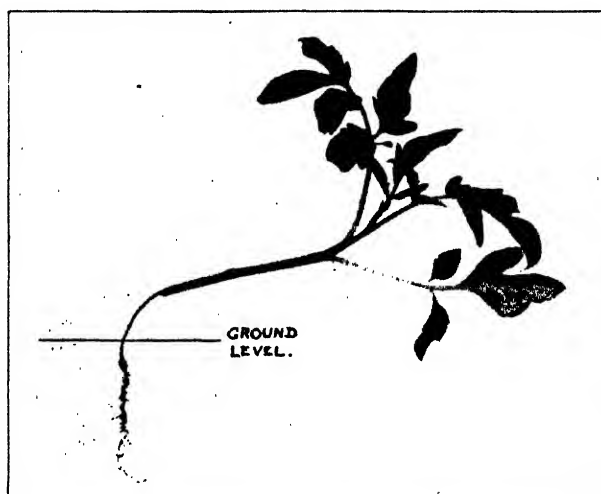


FIG. 15.—Seedling attacked by "damping-off" fungus, showing the construction of the stem at ground level.

Figure 16 illustrates the way in which the fungus threads penetrate the cells in the stem of the seedling. It will be seen that the fungus bores right through the cell-walls, and grows through the cells, absorbing food material from cell-sap and other materials present. The fungus threads branch and grow into more cells, so that the part of the stem which is attacked soon begins to collapse. The collapse of the stem-tissues follows the continued growth of the fungus, and when the latter has grown right round the stem the typical constriction at soil level results, and the plant topples over owing to the destruction of its supporting tissues. Fungus threads then grow out from the diseased tissue through the moist soil, and attack surrounding seedlings in the same way.

The fungus can spread to new positions in the seedboxes by minute swimming spores formed in egg-shaped swellings on branches of the fungus threads and then liberated into the surrounding water. These cannot swim far, but can be washed or splashed considerable distances during watering. Thick-walled spores are also formed later, which can resist drying and carry the fungus over from one season to another in the soil.



*Control.*—It will be seen from the above that the following are the important points in the control of damping-off:—

- (1) Do not use soil for seedbeds which has previously had the disease in it, for the fungus may still be present in the soil. Infected seedbed soils can be rendered safe by sterilisation with steam, but the apparatus required for steam sterilisation is usually not available to South Australian growers, who would find it cheaper to replace the soil in the seedbeds (very thoroughly). If it is particularly desired to sterilise infected soil this can be done with formalin. Details will appear in a subsequent issue.
- (2) Do not overcrowd the seedlings.
- (3) Do not over-water.

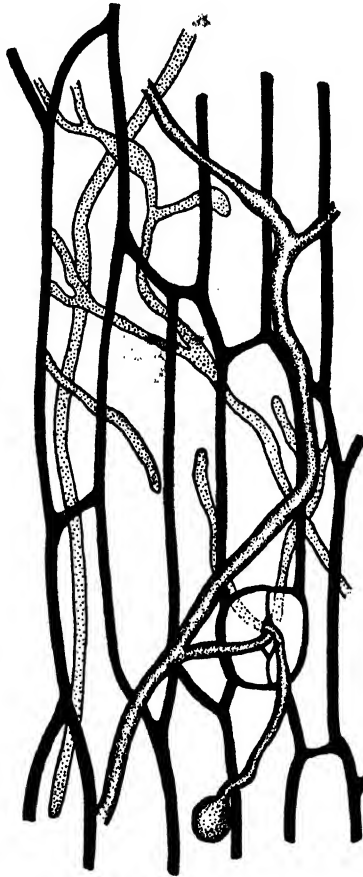


FIG. 16.—A "damping-off" fungus invading the cells of a seedling about ground level. The fungus has penetrated in at a breathing pore and can be seen growing within the cells inside, which will soon collapse. At this magnification the whole stem would be about 2ft. or 3ft. across. Plant cell-walls black; fungus dotted.

- (4) If the disease does appear, pull out infected seedlings as soon as they are seen, and water the seedbeds with Cheshunt Compound (see page 162, September issue; details of this Compound will appear later).

In England the water supply has sometimes to be considered as a possible source of infection, especially when drainage may come from neighboring properties on which tomatoes are grown. No cases have yet



come under notice in South Australia, however, in which infection could be traced to the water supply. In fact tomato seedbeds here are very free from damping-off troubles, and in cases where they have occurred it has usually been because one or more of the above points has been neglected. The pricking out of seedlings into one of the glasshouses before planting out is a practice which might easily favor the disease.

The following extract from Dr. Bewley's book on the "Diseases of Glasshouse Plants" shows how valuable Cheshunt Compound may be in checking off damping-off disease:—"During an epidemic at one nursery the grower replanted two houses four times, and each time lost practically the



FIG. 17.—Tomato plant (tall variety) wilting in the daytime owing to the roots and stem being invaded by the *Verticillium* wilt fungus. If the roots or the stem are cut open the wood inside is seen to be discolored a light brown by the fungus.

whole of his plants. When replanting for the fifth time the soil was treated with Cheshunt Compound, with the result that only four plants were lost out of 2,000."

#### VERTICILLIUM WILT.

**Description.**—This disease, which used to be called "Sleepy disease," is unfortunately fairly common in South Australian glasshouses, especially in the more clayey soils. It is primarily a disease of the roots and the water-conducting vessels of the stem, so that the symptoms shown by the



tops of the plants are secondary, due to the trouble down below. The symptoms vary considerably, depending to some extent on the soil, the variety, and the growing conditions.

Occasionally plants can become infected while still fairly young, and in this case they become "dull" or "sleepy" in appearance, seem as if they can't grow ahead properly, and sometimes acquire a purplish look. If they are pulled up, the ends of the roots will be found to be brownish and dying back, and the wood inside the roots discolored brownish.

More often, however, it is not until the plants are from 1ft. to 2ft. or more in height that they begin to show signs of becoming "sleepy." The growing point does not look vigorous and succulent, but becomes rather thin and spindly. The lower leaves begin to turn yellow gradually and may shrivel and brown from the margins. This occurs most frequently with the variety Early Dwarf Red on the more clayey soils, and as the yellowing leaves are usually pulled off, the lower truss or two of fruit is left bare. With tall varieties, leaf yellowing may not occur so much, and an actual wilting or drooping of the plant in the warm part of the day take place (Fig. 17), the plant recovering again at night.

In all cases, and in the later stages especially, if the root and base of the stem are slit open with a clean, sharp knife, it will be seen that the wood is discolored a light brownish color. Sometimes this discoloration of the wood runs right up the stem for some feet.

*Cause.*—The cause of this disease is a fungus (*Verticillium albo-atrum*), which lives in the soil and attacks the roots of the plants first. The fungus penetrates to the centre of the root, for it seems particularly adapted to living in the wood or water-conducting vessels (Fig. 19A). It grows upwards within the wood vessels, from the root into the stem, and finally extends in the wood almost throughout the entire plant. It is probably some substance secreted by the fungus which causes the wood of the plant to turn brown. It is partly the blocking up of the water-conducting vessels by the threads of fungus, and partly perhaps the poisoned substances which the fungus forms, that causes the plant to gradually wither from below upwards.

The fungus has two methods of lasting over from season to season and spreading in the soil. One is by the formation of spores in immense numbers on the base of the stems of infected plants. In late stages of disease, and when moisture conditions are favorable, the fungus grows out from the wood and forms spores in little heads on the ends of short branches arranged in rings or whorls as in Fig. 19B. These may be present in such numbers that they are visible as a white mouldy patch near the base of the stem (Fig. 18). The small spores can blow away or get washed away, and are capable of starting the fungus in a new situation.

In South Australia, however, these spores are not very often found, perhaps because of the dry summer heat. The fungus probably lasts over from season to season mainly by little resistant pieces of fungus tissue formed from interwoven fungus threads with thick walls. These are formed in considerable numbers in the diseased roots, and when a rotten root is pulled up it is impossible to avoid leaving many small rotted parts containing the fungus behind in the soil (Fig. 18). It is probably mainly from such bits of tissue left in the soil after pulling up the plants that the fungus lasts over from season to season. When moisture comes again at planting



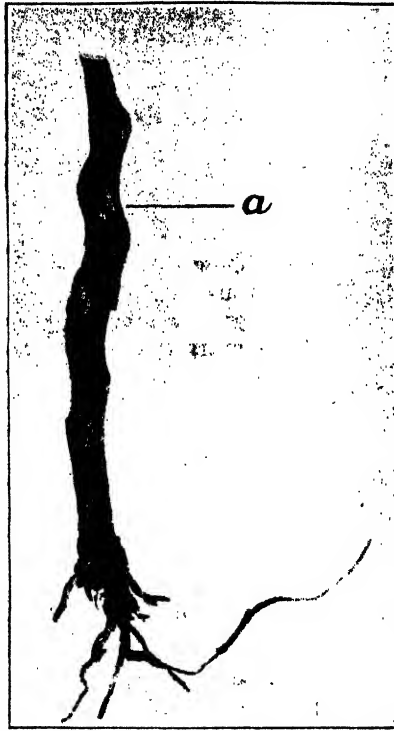


FIG. 18.—The base of the stem of a plant which died from *Verticillium* wilt and which was left in the house. Roots all rotted away and a white mouldy growth (a) just above soil level where thousands of spores are being formed by the fungus (see Fig. 19 b-d).

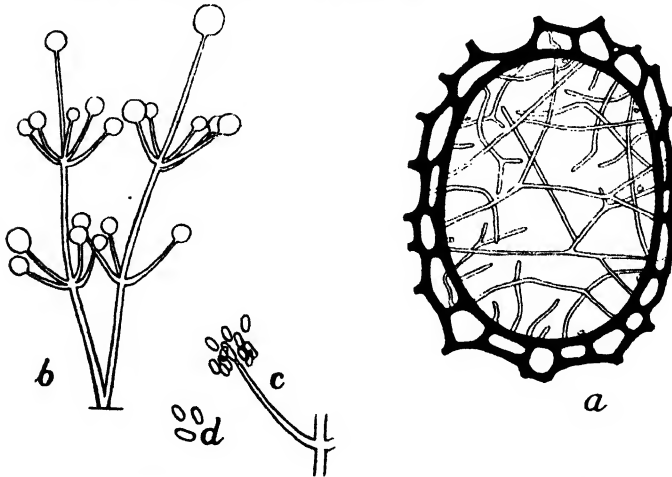


FIG. 19.—(a) Fungus threads of the *Verticillium* wilt fungus growing within the cavity of one of the water-conducting vessels of a tomato stem and blocking it up. Greatly magnified; compare with Fig. 1 (b) showing a water-conducting vessel blocked up by bacteria.

(b) Spore-bearing branches of the *Verticillium* wilt fungus formed in immense numbers at the stem-base of a plant which has been killed by the disease and left in the moist atmosphere of the glasshouse (see Fig. 18). The round globules are masses of spores embedded in slime, and this quickly dissolves in water and sets free the spores as in (c). Single spores shown in (d). Magnified 800 times.



time these bits of fungus tissue germinate, and any which come in contact with the new young seedlings may infect them and reproduce the disease again.

**Control.**—The control of *Verticillium* Wilt is very difficult in glasshouses of the type of those in South Australia, in which no heat is available. It is not possible to steam sterilise the soil every few years or to exercise any control over the temperatures in the houses during growth. This is particularly unfortunate in the case of *Verticillium* Wilt, for it has been shown in England that the disease can be fairly well controlled by raising the temperatures of the houses above 77deg. and applying a light shading of whitewash.

As usual, it is preferable to prevent a disease appearing rather than to try and check it once it has appeared. What we need, therefore, is some way of getting rid of the fungus from the soil other than steam sterilisation before the year's planting begins, if possible. This may not be as hopeless as it sounds. As was suggested before, the high summer temperatures in Adelaide might well have some partial sterilising effect on the soil during the later summer months when the houses are empty. Such an effect could probably be considerably helped by judicious treatment of the soil. If the old roots, &c., of last year's crop are pulled out as quickly as possible, and the house dug over and then left to dry out during one or more "heat spells," and then the process of flooding and digging repeated, the alternate wetting and drying might aid considerably in ridding the soil of root-rot fungi. Of course, if the previous year's crop was not infected treatment more than once would not be necessary, but the digging two or even three times is suggested as a method worthy of trial if many of the plants were affected with *Verticillium* Wilt in the crop just pulled out.

Having prepared the soil to the best advantage the young plants should be given the best possible conditions for growth according to the first few chapters of this bulletin. Dr. Bewley has shown that in the case of *Verticillium* Wilt, unlike most other diseases, it is not the succulent plants which get the disease worst, but the plants of harder and backward growth which have suffered some check or have not the best growing conditions which get the disease.

Returning once again to the subject of temperature, the checking effect on the disease of a bright and sunny spring and early summer is noticeable in South Australian glasshouses. We have had several such seasons lately, and *Verticillium* Wilt has not been as prevalent as it was formerly. In cases where it has occurred in spring it has disappeared considerably as the weather warmed up. It is doubtful whether shading for the disease is advisable under our conditions, for it would reduce the temperature, and this could not be kept up by more heat from the boiler, as in England.

Summarising the measures for control of *Verticillium* Wilt:—

- (1) Prepare the soil early and well, and let it dry out once or twice if the disease was present before.
- (2) Plant with vigorous seedlings and keep them growing well.
- (3) If the disease appears, heap soil higher up round the base of the stems to allow new roots to form, do not water too heavily, and keep the house as warm as possible.



## OTHER ROOT-ROT DISEASES.

*Description and Causes.*—Although *Verticillium* seems to be the main fungus responsible for root-rot diseases in the glasshouses of the Adelaide district, there are others which have been met with on a number of occasions. Further research work will have to be done to find out just how important these are, and what the conditions are which favor them. In most cases the symptoms of these root-rot troubles are much the same—spindly or poor growth, sometimes with wilting of the plant in the warmer part of the day, leaves yellowing from below upwards, and roots when pulled up found to be dying back from the tips often with a brownish discoloration of the wood inside. Affected plants, of course, finally die prematurely.

*Black Dot Root-rot* (caused by the fungus *Colletotrichum atramentarium*).—This is a disease which can be recognised by the naked eye in its later stages, owing to the presence of small black dots in the wood and bark of the rotted roots. When plants are pulled up the outer part of the roots often strips away, leaving the central strand of wood in which the minute black specks of the fungus can be seen (Fig. 20).



FIG. 20.—Roots of a plant affected with Black Dot root-rot, showing how the bark strips away from the wood; also the small black specks of the fungus in the rotten wood.

In England this fungus has been found to cause more damage when the soil conditions are somewhat dry, especially if cold as well. The fungus works very slowly, as a rule, and often becomes evident only because the top fruit-trusses fail to swell properly. In one case, however, an example of a severe effect of this fungus in an early stage was obtained when a hail-storm broke in the roof of a glasshouse recently planted with young plants. The plants were exposed to the cold for only two or three days, but when a new roof was put on they did not make any headway, remaining stunted and rather purplish in color. When pulled up the roots were found to be rotting back and brownish inside, and a scientific examination showed that they were affected by the Black Dot fungus.

(To be continued.)



## EELWORMS (*Heterodera schachtii* Schm.) AFFECTING CEREALS IN SOUTH AUSTRALIA.

[By J. DAVIDSON, D.Sc., F.E.S., Waite Agricultural Research Institute, University of Adelaide.]

In the August number of this *Journal* for 1928 Mr. G. Samuel gave some observations on "Two 'stunting' diseases of wheat and oats." Affected plants were recorded from unhealthy patches occurring in these crops in various localities in South Australia. Examination of these plants showed that eelworms, which were referred to as possibly a species of *Aphelenchus*, were present in some cases. In others a fungus disease, apparently due to a species of *Rhizoctonia*, was found. These two parasites were evidently important factors affecting the condition of the plants. Mr. Samuel discussed the matter with me when I came to Adelaide in 1928 and kindly placed at my disposal the information he had obtained regarding eelworm infestation.

Since October, 1928, I have been able to make further observations regarding the species of eelworm concerned. It has been found that it is a species of *Heterodera*, namely, *H. schachtii*, and that it occurs on oats and wheat and to a less extent on barley, in various districts in South Australia.

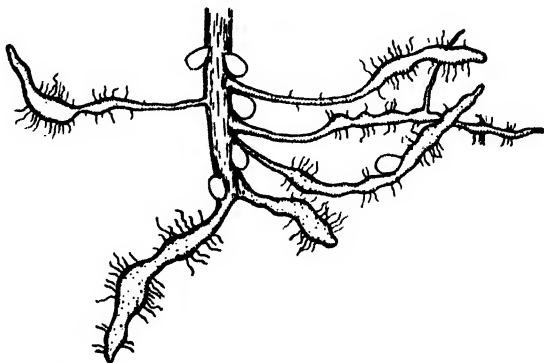


Fig. 1.—An affected Oat plant with female Cysts on roots—September, 1930.

In September last Mr. A. E. Hickinbotham observed the widespread distribution of the pest in the Roseworthy district, and invited me to visit the area. Mr. Hickinbotham has now made a survey of the distribution of the pest in that district, and his valuable observations emphasise its importance in relation to cereal crops.

*Heterodera schachtii* is known as a pest on roots of oats in Scandinavia and Holland; also, to a less extent, on wheat and barley. It has been called the *Oat eelworm* in Denmark, so I have adopted this popular name, but it is clear that other cereals are affected by its attacks.



I.—RECORDS OF THE OAT EELWORM (*Heterodera schachtii*) ON CEREALS IN SOUTH AUSTRALIA.

So far as I am aware there is no published record of this species attacking cereals in South Australia. In an article by Mr. W. J. Spafford (*Journal of Agriculture, South Australia*, January, 1919) on "Trouble affecting cereals in the Penola district," there are several remarks regarding eelworms, but there is no definite evidence that this species was present. Mr. Spafford has very kindly sent me notes of references to eelworm attack on cereals, taken from the filed records in the Department of Agriculture dealing with diseases of crops in the State.

In most of these records, however, it is not possible to say definitely from the information available whether the species which we are now discussing was present. As long ago as 1906 barley plants grown at Roseworthy Agricultural College were sent to Mr. D. McAlpine, Plant Pathologist in the Department of Agriculture, Victoria. The following extract is taken from Mr. McAlpine's letter, dated August 15th, 1906:—  
" . . . The roots of some of the worst specimens were first washed, and then the swellings on the roots, &c., looked suspicious. On examining the very butt of the stems eelworms were found, and I have no doubt but Nematodes are the cause of the trouble . . . " The indication that *Heterodera schachtii* might have been present is suggested by the reference to the "swellings on the roots, &c."

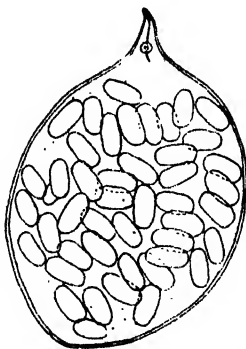


Fig. 2.—Mature female of the Oat eelworm.

In August, 1918, a sample of wheat plants received from Mr. H. W. Tossell, of Maitland was reported on by Professor T. G. B. Osborn, as follows:—"The wheat is infected by a parasitic worm which lives inside the root tissues, causing a knot disease . . . Attempts to isolate a fungus or bacterium from the tissues gave uniform negative results." Evidently this was a species of *Heterodera*, and doubtless *H. schachtii*. In October, 1922, wheat (var. Nugget and Major) and oat (Algerian) plants from different fields on Mr. H. W. Tossell's farm at Maitland were reported on by Professor T. G. B. Osborn on October 18th, 1922, as follows:—"The trouble here is eelworm, not fungi. The wheat especially being badly infected with galled roots and cysts easily seen. I have shown the specimens to Mr. O. W. Tiegs, Lecturer in Zoology, who says the worm is *Heterodera schachtii*, not *H. radicola*."

In August, 1926, wheat plants received from Narridy and Paskeville were identified by Mr. Samuel as affected by eelworms, cysts being found on the roots. During September wheat and oat plants from Maitland were found to be similarly affected.



Further records were obtained by Mr. Samuel during 1927, 1928, and 1929. There is no doubt that the species concerned in these earlier records was the same as that diagnosed from later affected samples, namely, *Heterodera schachtii*. Samples of affected wheat and oat plants collected at Murray Bridge in October, 1928, were sent by the writer to Dr. T. Goodey, Institute of Agricultural Parasitology, St. Albans, England. Dr. Goodey reported that cysts of *Heterodera schachtii* were present on the roots of both the wheat and oat plants.

The records listed below, from 1926 onwards, have been definitely established by examination, either by Mr. Samuel or myself, of affected plants obtained from the various districts, chiefly through the agricultural instructors. Although the earliest definite record is given as October, 1922, it is evident, considering the distribution of the pest, that it has been affecting cereal crops in this State from an earlier period.

| Year.     | Month.         | District.              | Crop.                                                                 |
|-----------|----------------|------------------------|-----------------------------------------------------------------------|
| 1922..... | October .....  | Maitland .....         | Wheat, var. Nugget, var. Major Oats                                   |
| 1926..... | August .....   | Narridy .....          | Wheat                                                                 |
|           | August .....   | Paskeville .....       | Wheat                                                                 |
|           | September .... | Maitland .....         | Wheat and oats                                                        |
| 1927..... | April .....    | Hamilton .....         | Wheat and oats.                                                       |
|           | August .....   | Hamilton .....         | Wheat                                                                 |
|           | August .....   | Encounter Bay .....    | Oats                                                                  |
|           | September .... | Salter's Springs ..... | Wheat, var. Bena                                                      |
|           | October .....  | Maitland .....         | Wheat                                                                 |
|           | December ....  | Kangaroo Island ....   | Wheat                                                                 |
| 1928..... | July .....     | Narridy .....          | Wheat                                                                 |
|           | July .....     | Murray Bridge .....    | Oats                                                                  |
|           | July .....     | Wolseley .....         | Oats                                                                  |
|           | August .....   | Roseworthy .....       | Wheat, var. Leak's Rust-proof Huguenot, Currawa Oats, var. Early Burt |
|           | August .....   | Redhill .....          | Wheat                                                                 |
|           | August .....   | Manoora .....          | Wheat                                                                 |
|           | September .... | Saddleworth .....      | Wheat                                                                 |
|           | September .... | Wild Horse Plains....  | Wheat                                                                 |
|           | October .....  | Gawler .....           | Wheat                                                                 |
|           | October .....  | Hamley Bridge .....    | Oats                                                                  |
| 1929..... | August .....   | Encounter Bay .....    | Oats                                                                  |
|           | August .....   | Murray Bridge .....    | Wheat                                                                 |
|           | August .....   | Yorketown .....        | Oats and barley                                                       |
|           | September .... | Paskeville .....       | Wheat                                                                 |
|           | September .... | Riverton .....         | Wheat                                                                 |
|           | September .... | Adelaide .....         | Oats, var. Early Burt                                                 |
|           | October .....  | Riverton .....         | Oats                                                                  |
| 1930..... | July .....     | Riverton .....         | Oats                                                                  |
|           | August .....   | Kapunda .....          | Wheat, oats, and barley                                               |
|           | September .... | Gawler .....           | Wheat and oats                                                        |
|           | September .... | Culburra .....         | Wheat                                                                 |
|           | October .....  | Saddleworth .....      | Wheat, var. Sepoy, var. Wannon                                        |
|           | October .....  | Yorke Peninsula ....   | Wheat                                                                 |
|           | October .....  | Adelaide .....         | Barley, oats                                                          |
|           | October .....  | Roseworthy .....       | Wheat, oats, barley                                                   |



## II.—THE OAT EELWORM IS FOUND ON CEREALS IN OTHER COUNTRIES.

*Heterodera schachtii* was found on the roots of oats by Kuhn in 1874, and it is well known as a pest of oats in Denmark. In that country wheat is stated to be much less affected than oats, and rye seldom affected. It is also recorded on oats in Holland, and barley in Scandinavia and Holland. In 1926 Russel recorded an eelworm from the roots of wheat in Saskatchewan, which, from the published information, apparently resembles *H. schachtii* in its behaviour on the roots of the plant. It is, however, stated by Thorne (*Scientific Agriculture*, 1928, vol. 8) to be a new species, namely, *H. punctata*.

III.—*Heterodera schachtii* IS AN IMPORTANT PEST IN SEVERAL COUNTRIES.

In addition to cereals this eelworm is a serious and widely distributed pest of sugar beet in Europe. The species was in fact first discovered on the roots of sugar beet by Schacht in 1859. In 1913 it was found on potatoes in Germany, and is now known to be a pest of that crop in parts of England and Germany.



Fig. 3.—Young larva of the Oat eelworm.

In addition to the above crop plants it has been recorded from a number of other plants, including certain weeds. It is generally accepted, however, that distinct races or strains of the species occur, each strain being restricted to a limited number of these host-plants.

IV.—STRAINS OF *Heterodera schachtii*.

There is considerable evidence to show that distinctive strains of the eelworm occur, each strain having its own distinct range of host-plants. In Denmark, for instance, the strain attacking sugar beet is present and is considered to be distinct from the strain found on oats. Moreover, the other host-plants, such as weeds, &c., are not the same for the two strains.

This is a question of great importance in considering the practical aspect of the problem, and it is necessary to find out the range of host-plants on which the South Australian strain occurs.



It will be seen in a later paragraph that the soil is the source of infection. The behaviour of the eelworm population in the soil towards the crop grown on it, depends upon the crop (host-plant) with which earlier generations of the eelworm have been associated. Long association with particular host-plants appears to result in a specialised strain which become less fitted to succeed on certain other plants.

The available records from South Australia indicate that oats and wheat are particularly attacked, and barley to a less extent, but further records are required. Investigations in Denmark show that oats especially suffer from the pest, but wheat and barley are also to some extent susceptible. Nilsson-Ehle (*Hereditas*, 1920) found that certain varieties of barley are resistant, and that this character is hereditary. Experiments showed that where oats were grown in eelworm infected soil, following resistant varieties of barley, the yield of the oat crop was greater than after susceptible varieties of barley. The explanation appears to be that with the susceptible varieties of barley the eelworm population in the soil was increased, whereas with the resistant varieties on which the pest failed to develop, it was decreased.

These results indicate a promising line of investigation in relation to the problem in South Australia, and the first step should be the systematic collection of data regarding the intensity of attack on wheat, oats, and barley, and on different varieties of these cereals.

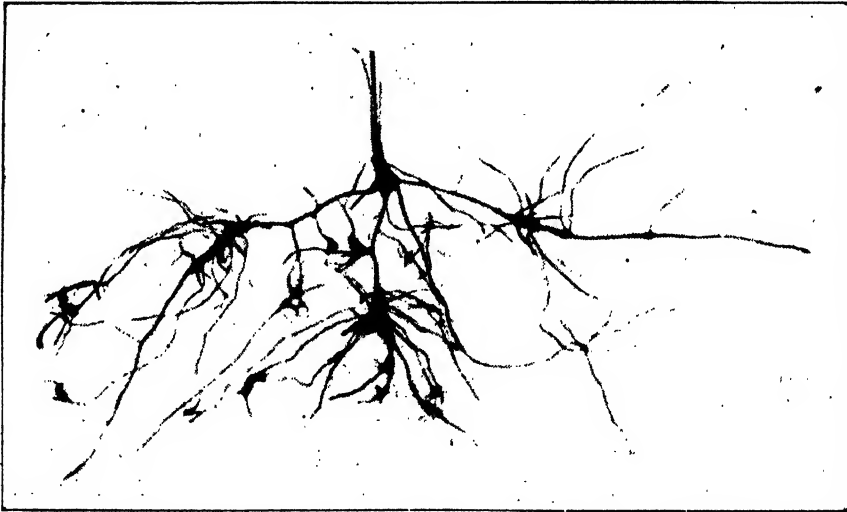


Fig. 4.—An affected Wheat plant (September, 1929.)

#### V.—LIFE HISTORY OF THE OAT EELWORM (*Heterodera schachtii*).

The only stage of the worm which is visible to the naked eye is the white distended female found attached to the roots of affected plants (Fig. 1). When full grown the female is about  $\frac{1}{25}$ th inch long (Fig. 2). Its head end is firmly inserted into the tissues of the root. The whitish lemon-shaped body is greatly distended, owing to the large number of eggs it contains. When the female dies the body remains surrounding the eggs, thus forming an egg case or cyst, which becomes darker and eventually drops off into the soil.



If the conditions in the soil are unfavorable these cysts may remain dormant for many months as brown, resting cysts.

When conditions in the soil are favorable, particularly as regards moisture and temperature, minute, active worms about 1/70th inch long hatch out from the eggs and emerge from the cysts into the soil (Fig. 3). They are attracted to the roots of the host-plant apparently by the influence of secretions given out from the roots into the soil. They bore into the delicate tissue of the fine roots and then undergo further development. At this stage they differentiate into males and females.



Fig. 5.—Affected Oats, var. Early Burt (October 19, 1929.)

The females gradually increase in size, and, feeding on the juices of the root tissues, stimulate the latter to abnormal growth which results in the knotted appearance of affected roots (Fig. 1). As the females increase in size the body is forced out through the epidermis of the root on to the surface. The head end remains firmly fixed in the tissues, on the juices of which the females continue to feed. From this stage onwards the white, swollen female worms may be easily seen on affected roots. They are now ready for fertilisation by the male. After fertilisation the females greatly increase in size owing to the development of the numerous eggs, and become the conspicuous,



whitish, lemon-shaped bodies found on the roots. The length of the complete life cycle from the egg to the sexually mature adult varies according to the conditions, but is stated to be about four to five weeks.

The *males* behave differently from the females. After undergoing development in the root tissues they bore their way out through the epidermis into the soil as normal thread-like worms about 1/25th inch long. They seek out the females on the roots and fertilisation takes place.

#### *The Cysts.*

The egg sacs, or cysts, may contain 100 or more elongate eggs. During the growing season the conditions of the soil are suitable for the development of the embryos in the eggs, so that more than one generation of the worms may develop during that period. Female cysts have been noted on the roots of wheat and oats in South Australia at various times from April to October, but it is not yet possible to say how many generations of the worm occurs during the season. Doubtless the dry summer months are passed through in the soil in the resting cyst stage. The cysts are hygroscopic and swell up with moisture but shrink under dry conditions. With the beginning of the winter rains in April the conditions are suitable for the development of the eggs, and the young larval worms appear to emerge from the cysts at the time when the young cereal plants have started to grow.

The eggs in a resting cyst apparently do not hatch all at the same time, and it has been stated (Fuchs, 1911) that after five years in clean fallowed ground cysts may contain young. Research is necessary to find out what is the viability of the cysts under fallow conditions in South Australia, also the influence of soil temperatures and moisture on the hatching of the eggs and the length of time taken to complete development.

#### VI.—SYMPTOMS OF PLANTS ATTACKED.

The presence of the whitish swollen females or lemon-shaped cysts on the roots is a sure guide to affected plants. The early stages of the worm may be found by dissecting the root tissues, but in my experience they are not easy to find, and I have only obtained isolated individuals in a few cases. In the absence of these stages however, affected plants may be diagnosed by the abnormal root development. As seen in fig. 4, young wheat plants have nodular thickenings on the roots from which numerous lateral roots are given off. Owing to this abnormal growth the root system sometimes consists of a dense mass of delicate superficial rootlets. With oats (Fig. 5) the knotted character of the roots is often more pronounced. The plants appear to be attacked soon after root development begins, but the characteristic white females are not evident until a few weeks later. When the crop is a few inches high, weedy patches may be noticed in which the plants are thinner, shorter, and in general have an ill-nourished appearance. These patches are often referred to as "no-growth patches." Such plants have often been found attacked by the eelworm. The occurrence of these patches, however, cannot be considered as always due to this pest. Foot-rot fungi may be a contributory cause. A water-logged condition of the soil in local depressions may also result in "no-growth" patches.

My observations show that the actual effect of the eelworms on the plants as judged by their above-ground appearance varies considerably, so that with a general infestation over a paddock the crop will look patchy. Plants showing apparently normal growth may have female cysts on their roots as well as poor, spindly, weak plants. The damage to the roots due to the activity of the worms undoubtedly affects the growth of the



plants. The root system tends to be shallower, and is, therefore, more susceptible to changes in soil moisture. The chances of obtaining adequate nourishment are reduced. Indirectly, therefore, affected plants show the effects of poor nutrition.

In a particularly heavy infestation the growth of many plants may be completely checked, resulting in a partial failure of the crop. The effect will be particularly marked if other adverse influences are affecting the growth of the crop. Provided conditions for growth are good, the check to the root system of the plants by a normal or light infestation of the eelworm may not be obvious in the general appearance of the crop. With vigorous development of new roots and the relatively large root system of well-nourished plants, the latter are able to make progress against the attack. In this respect it has been observed that late sown crops appear to suffer more heavily than early sown.

It is evident that eelworm attack affects the yield of the crop to a greater or less extent. The loss is doubtless greater in some seasons than in others, due to the influence of varied seasonal conditions on the growth of the crop and the intensity of the eelworm infestation.

#### VII.—CONTROL MEASURES.

There appear to me to be three lines of attack along which practical control measures may be developed:—

- (a) Cultivation methods.
- (b) Rotation.
- (c) Varietal differences in susceptibility to the attack.

##### (a) *Cultivation Methods.*

It is important to give the best possible conditions for the growth of the crop, particularly in its early stages. Such conditions will be obtained by good cultivation, early sowing where practicable, compacting the ground to encourage root development, and by the application of superphosphate at the time of seeding so as to give the young plants a good start.

##### (b) *Rotation*

The aim of the rotation system should be to allow the infested area to remain free from a susceptible crop as long as possible. This will reduce the eelworm population in the soil. Owing to climatic features the extent to which rotation can be practised in South Australia is greatly restricted. Moreover, further knowledge is necessary regarding the susceptibility to attack of suitable rotation crops, also as to the relative susceptibility of wheat, oats, and barley. Definite information is also required regarding the influence of fallow on the eelworm population in the soil under South Australian conditions.

##### (c) *Resistant Varieties of Cereals.*

The work of Nilsson Ehle in Sweden on the varying degree of susceptibility of different varieties of barley indicates the most promising line of attack. The accumulation of systematic observations on the extent to which different varieties of wheat, oats, and barley are attacked would be most valuable. Less susceptible varieties could be worked into a rotation system, and the possibility of breeding resistant varieties could be explored.



## EELWORM, AND "NO-GROWTH" PATCHES.

[By A. R. HICKINBOTHAM, B.Sc., Dip. Ed. (Roseworthy Agricultural College).]

Towards the end of August, when most of the later-sown crops were beginning to make vigorous growth, certain "no-growth" patches (Figs. 1 and 2) appeared in the permanent rotation trials, in barley, at the Roseworthy Agricultural College.

No-growth patches have been familiar over a large area of the dryer part of the State for many years past, and they have been spasmodically investigated, but up to the present no cause has been found. Patches appear to follow the main direction of cultivation as if carried by implements, and are of limited area, those shown in the photographs being typical of those seen this season in barley. Recently a local Bureau supplied a list of 12 farms that show this trouble.

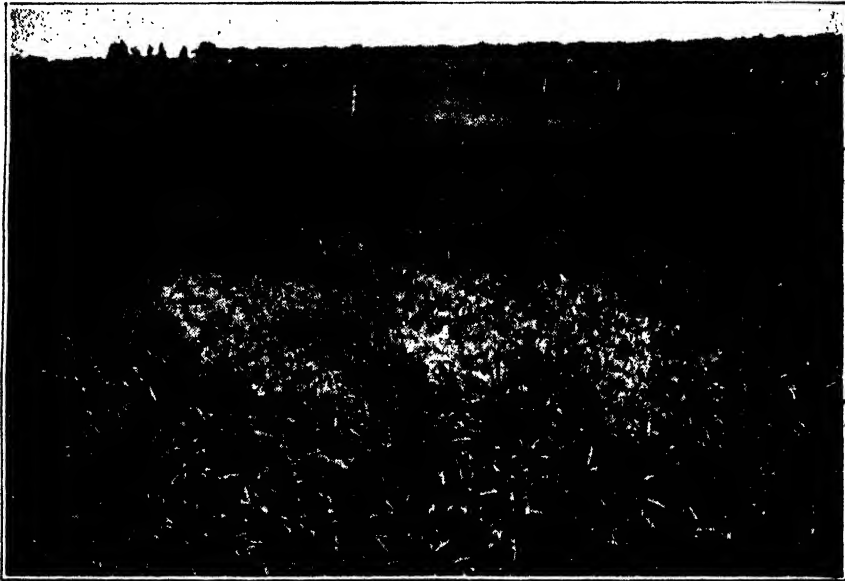


Fig. 1.—"No-growth" patch (Barley) showing stunted plants in patch.

On making a careful examination of the College rotation plots, it was seen that two plots of oats—of two acres each—were not making anything like satisfactory growth, and the plants themselves seemed to show the same characteristics as those on the no-growth patches. It seemed likely that the whole of these two oat plots were similarly but less seriously affected.

Samples of soil and affected plants were taken from two College plots and from no-growth patches on three neighboring farms. Microscopic examination of the roots of affected plants seemed to show certain ill-defined abnormalities, but the difference between these and the roots of nearby and apparently healthy plants were not marked. Mr. Garrett, of the Waite Institute, made a series of bacterial cultures without result, though several fungi were present.



Affected barley plants were transplanted into pots—some in their own soil and some in soil of a lighter type from a different area. The pots were well watered, and the plants in both soils recovered and grew strongly; those in their own soil did appreciably better. The plants, however, showed a certain robustness or stiffness in growth, and did not tiller as expected. These abnormalities were sufficiently pronounced to suggest disease in the plants themselves rather than in the soil, but, at the same time, the plants growing in their own soil showed this characteristic more markedly.

Some three weeks after the first plants were examined a further set of samples was taken, and on the roots of these minute eelworm cysts were noticed. The cysts, varying in number up to 10 or 12 per plant, were found throughout the no-growth patches. The cysts are female eelworms which have developed until they are little more than a sack of eggs—each containing 100-200. They are attached to the plant by means of the head, which is still buried in the tissues.

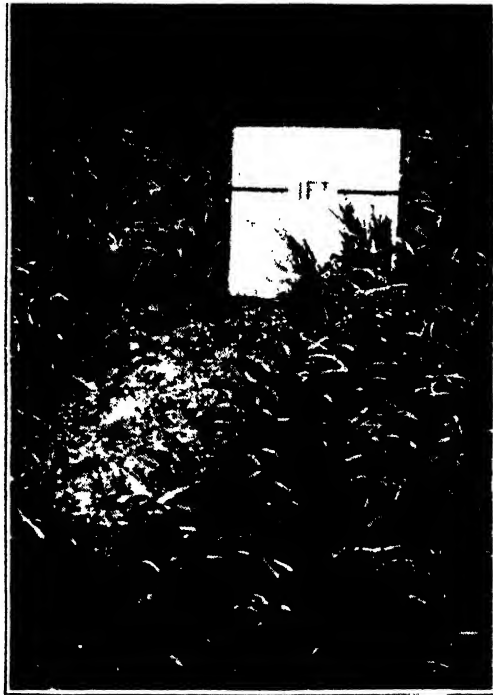


Fig. 2.—“No-growth” patch (Barley) showing definite margin.

Examination of the two-acre oat plots (40-50 plants were taken) showed every plant similarly affected. In the next field was a wheat crop that had been very backward in the early stages, and had been rolled and harrowed to try to promote growth. Plants were taken from this, and every plant taken showed some eelworm cysts.

The question then arose as to whether apparently normal crops had escaped the eelworm, and it was found that these also showed cysts, but a much smaller number per plant, and a correspondingly better root development.

It was soon found that almost every crop on the farm was affected; backward crops were more severely attacked. Late-sown oats, and oats on stubble, showed the heaviest infection (judged from the number of cysts showing). Fig 3 shows portion of a strip



of late-sown oats between two plots sown about a month earlier. In the late-sown plot the oats are a failure, and the bulk of the growth consists of weeds, while the earlier-sown plots appear to be normal crops. This strip contains many patches quite bare except for charlock and other odd weeds. Fig. 4 shows the roots of some of the surviving plants (and one dead plant) taken from it.

The other affected farms in the district were visited, and the no-growth paddocks proved to be similarly affected. Wheat after fallow largely seems to escape severe infection, though a few cysts are almost always found. An infected wheat field shows a patchy stand, with a gradual falling away of the crop from point to point, rather than sudden bare areas. In many fields the crop is decidedly thin, and weeds are frequently dominant over a large proportion of the area, this being the more heavily infected part.

In barley the actual no-growth patches occur with quite definite margins. Of two plants at the edge of the patch an inch apart, one may be vigorous and the other but 1 in. high (Figs. 1 and 2). These patches may not be caused by eelworm, for barley appears in many cases to make quite satisfactory growth in spite of severe infection.

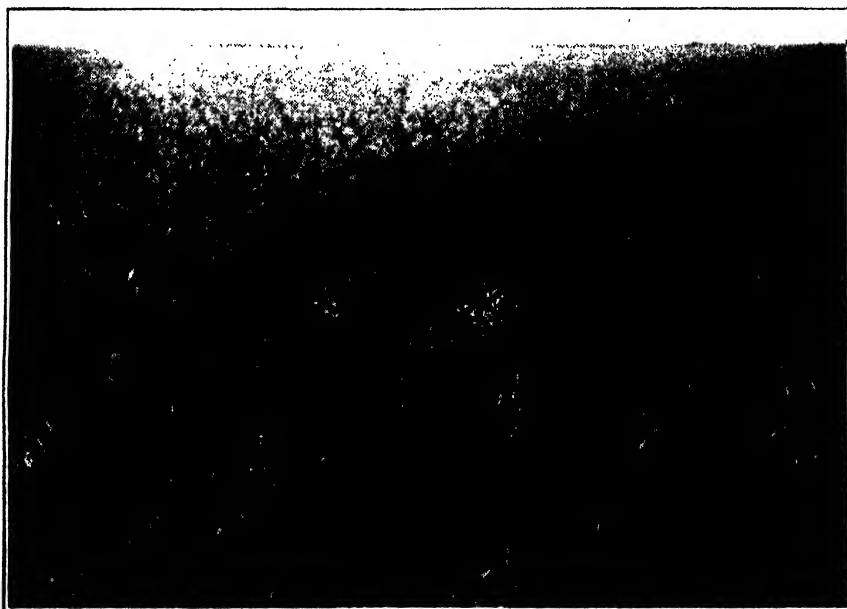


Fig. 3.—Eelworm infected late-sown oats (mostly Charlock with a few surviving oat plants) with normal early crop in background.

In oats the whole field seems to be more or less evenly attacked. Most frequently no normal plants are noticed in the field. The result is that the field just appears to be a backward crop, and little or no hay is taken from it. It is recognised locally that late sowing of oats invites failure.

In one field of possibly 50 acres near Wasleys, part is in wheat and part in barley. The barley appears to be a good crop, but has numerous no-growth patches. The wheat shows the characteristic irregular stand. This was planted first with old seed and, the result not being satisfactory, it was cross drilled again with new seed. One may infer



that the plants from the old seed, having less vitality, were mostly destroyed by the eelworm. The new seed got away better, but did not escape infection. Cysts were numerous on the roots of both barley and wheat.

As stated previously, if attacked, oats seems to be uniformly and seriously infected, wheat irregularly, and barley gives largely a normal crop. A local farmer with nearly 10 years' experience of no-growth patches states that they are never serious unless barley has been grown in the paddock. If this be so, and if the patches are due to eelworm, the growth made by barley in spite of infection would probably assist the spread of the parasite, and the area might be expected to be more seriously infected after this



Fig. 4.—Roots, showing cysts, of some of surviving plants taken from strip shown in Fig. 3. The second plant has been killed.

crop. He pointed out a paddock which, as far as he knew, had never carried barley; it has been remarked that the present crop on that paddock is one of the best in the district, and though this crop proved to be affected the cysts were comparatively rare.

Comparing crops seriously infected with those less infected—judged by the number of cysts present on the roots—one cannot doubt that badly-infected crops will show a material difference in yield. In College plots now known to be seriously infected (mentioned above) the average yields have been practically 10bush. below those obtained in the outside fields. The difference may, or may not, be due to eelworm; the point must receive serious investigation.



Many infected crops appear to recover with better growing weather, but on the College alone 200 acres of oats—mostly on stubble—have failed more or less completely, and all these crops are heavily infected with eelworm.

#### DISTRIBUTION.

To get some idea of the distribution of eelworm in this part of the State a survey was made of crops along the roads between College, Roseworthy, Freeling, Templars, College, and College, Wasleys, Mallala, Reeves Plains, College. In all 72 crops were examined along about 60 miles of road, and of these cysts were found in 70. The examination was made by pulling several small bunches of plants, and in 75 per cent. of the crops every bunch showed some cysts. In addition, many crops between College and Adelaide have been examined with similar results. The crops examined may be considered as representative of at least half a million acres, through all of which eelworm infection occurs in nearly 100 per cent. of the crops. Of the 70 infected crops 43 were wheat, 15 oats, and 12 barley. The uninfected (non-cysted) crops were one each of wheat and oats.



Fig. 5.—The effect of serious eelworm attack on root development. Matted, superficial, infected roots compared with normal penetrating roots of unaffected plants (from Freeling).

The Agricultural Instructors throughout the State were asked to examine crops in their districts and to report on the percentage of infected crops found.

Mr. W. C. Johnston, Lower North, reported that infection was widespread, and in his opinion considerable losses were being suffered throughout his district.

Mr. E. S. Alcock, South-East, stated: "This disease has been responsible for considerable reductions in returns in this district for some years."



Mr. R. L. Griffiths, Murray Mallee, stated that in 1928 it was present to some extent in a large number of crops throughout the centre and southern portions of his district, and in a few cases seriously reduced yields. In 1929 no crops were seriously affected, but this year it is again in evidence. . . . In a few cases the loss is quite serious, and some of these are on paddocks badly affected in 1928.

Mr. R. Hill, Central District, reported that he has been collecting specimens for several seasons, and that it had been detected from Victor Harbor to the lower end of Yorke Peninsula, and even on Kangaroo Island.

These facts leave no doubt as to the wide distribution of this parasite. It has been recorded previously on several occasions in South Australia, but it has never been suggested (as far as we are aware) that it was at all widespread. In fact, there seems to be no instance cited anywhere of such a widespread and uniform invasion of crops.



Fig. 6.—Rootlets showing the effect of eelworm. (Various stages).

The damage done by it, and the consequent losses suffered by farmers, can only be estimated at present: they appear to be considerable. Experiments are being commenced to obtain proof of the losses involved. Accounts from overseas indicate that they range from almost nothing to total failures according to the severity of the attack.



## RESULT OF INFECTION.

There are at least four ways in which damage results from the infection. Firstly, the minute worms live in the root tissues and extract the nourishment intended for the growth of the plant, resulting in slow and stunted growth in the early stages. When the seminal roots are infected the production of the crown roots, upon which the plant really depends, is delayed for some weeks. Once the crown roots are formed the plant seems to get away from the infection, but the check must reduce the final yield. If the plant is unable to produce crown roots, it dies.

Secondly, the affected plants make so much root growth in the surface inch or so of soil that few, if any, deep roots are produced (Fig. 5). When a worm lodges in a root, the plant to combat it produces a number of roots from that point (Fig. 6), and if these in turn are infected a tangled root system is developed at the surface, with a very limited feeding range and resistance to drought, instead of normal penetrating roots.

Thirdly, if crops are likely to be weedy the check of the plant enables the weeds to get ahead, and for the rest of the season the crop has the competition of the well-established weeds. The only weed on which the eelworm has been found as yet is the wild oat. This is occasionally infected, and no doubt often helps the eelworm to survive over fallow and pasture periods.

Finally, the damage to the root, by weakening the plant and breaking the tissues, must render it susceptible to root fungi such as take-all. It is possible that these and other fungi (which are also widely distributed) would be of much less importance if eelworm did not previously sap the vitality of plants and provide an entry into the tissues.

It may be suggested that eelworm is a seasonal affliction, and that this is an unusually bad season for it. Though this is doubtless partly true, it would hardly seem to be the case to any marked extent, since many observers state that they have seen it frequently in past seasons, but thought that it only affected small areas. It appears to have been in our soils for a long time: as far back as 1906 the late Mr. McAlpine, then Plant Pathologist of Victoria, diagnosed eelworm on specimens sent to him from this College.

The lesser problem of the relation of eelworm to no-growth patches must still be regarded as an open question. In this connection it is interesting to note that, in the communication mentioned above, McAlpine stated that eelworm was a common cause of bare patches in crops. Naturally bare patches can appear from many causes, and there seems to be no generally accepted definition of what constitutes the so-called "no-growth" patch. It has been found impossible to secure consistent descriptions of them, and it seems probable that they may be of more than one kind and, further, difficulty may arise from their having a somewhat different appearance in different cereals. There is no doubt that heavy eelworm infection and certain no-growth patches go together, but the extent to which they are cause and effect cannot be determined definitely without further knowledge of the eelworm's life history under local conditions.

The major problem, however, appears to be one of very great importance. If proportionate losses like those noted above for this area prove to be more or less general over the great portion of the State now known to be infected with eelworm, it is a problem whose successful solution is of vital importance to the whole State.

The species of eelworm found was believed to be *Heterodera schachtii*. Dr. Davidson, to whom specimens were submitted, confirmed this identification, and, at his suggestion, samples of wheat, oats, and barley showing the cyst stage have been forwarded to the Imperial Bureau of Helminthology.



## NARRUNG HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                          | Butterfat.            |                      |                          | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|--------------------------|-----------------------|----------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during Sept. | Per Cow during Sept. | Per Cow October to Sept. | Per Herd during Sept. | Per Cow during Sept. | Per Cow October to Sept. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                     | Lbs.                  | Lbs.                 | Lbs.                     | %             |
| 5/C...   | 30                           | 25.47                        | 19,707                | 656.90               | 5,984.97                 | 911.71                | 30.39                | 297.15                   | 4.63          |
| 5/D...   | 32.60                        | 30.30                        | 23,771                | 728.56               | 5,850.40                 | 1,108.97              | 33.87                | 302.98                   | 4.66          |
| 5/E...   | 38.17                        | 31.53                        | 23,013                | 602.91               | 5,398.58                 | 1,159.41              | 30.37                | 289.33                   | 5.04          |
| 5/F...   | 19                           | 14.87                        | 12,694                | 668.11               | 4,995.68                 | 514.67                | 27.09                | 216.70                   | 4.05          |
| 5/O...   | 27                           | 26.20                        | 21,538½               | 797.72               | 5,506.02                 | 1,067.20              | 39.53                | 286.47                   | 4.95          |
| 5/R...   | 44.47                        | 38.47                        | 26,058                | 585.97               | 4,290.59                 | 1,053.77              | 23.70                | 188.92                   | 4.04          |
| 5/S...   | 80                           | 29.53                        | 20,523                | 686.73               | 5,433.59                 | 988.99                | 32.97                | 272.84                   | 4.80          |
| 5/T...   | 21.38                        | 18.97                        | 16,921½               | 793.32               | 5,754.27                 | 749.53                | 35.14                | 269.63                   | 4.43          |
| 5/U...   | 20.93                        | 19.98                        | 20,758½               | 991.80               | 10,003.87                | 913.89                | 43.66                | 459.09                   | 4.40          |
| 5/V...   | 25                           | 21.68                        | 12,741½               | 509.68               | 4,172.01                 | 645.32                | 25.81                | 209.75                   | 5.06          |
| 5/CC...  | 35                           | 34                           | 25,410                | 726.00               | 4,711.44                 | 1,040.67              | 29.90                | 202.04                   | 4.12          |
| 5/Z...   | 30                           | 29.50                        | 31,440                | 1,048.00             | 8,505.12                 | 1,414.22              | 47.14                | 408.54                   | 4.50          |
| 5/AA...  | 19                           | 15.57                        | 7,493                 | 394.37               | 4,804.60                 | 365.95                | 19.26                | 261.03                   | 4.88          |
| 5/Y...   | 29                           | 24.87                        | 18,654                | 643.24               | 6,087.65                 | 956.86                | 33.00                | 370.62                   | 5.13          |
| 5/DD...  | 22                           | 17                           | 11,247½               | 511.25               | 5,574.74                 | 567.01                | 25.77                | 292.92                   | 5.04          |
| 5/EE...  | 17                           | 13.13                        | 13,101                | 770.65               | 5,719.11                 | 617.93                | 36.35                | 297.30                   | 4.72          |
| 5/GG...  | 18                           | 15.10                        | 10,845                | 602.50               | 5,176.50                 | 504.63                | 28.04                | 250.94                   | 4.66          |
| 5/HH...  | 18                           | 13                           | 8,385                 | 465.88               | 4,331.17                 | 376.52                | 20.92                | 205.03                   | 4.49          |
| 5/II...  | 28                           | 25.43                        | 21,948                | 783.66               | 6,772.77                 | 1,043.81              | 37.28                | 322.23                   | 4.76          |
| 5/JJ...  | 28.78                        | 27.78                        | 27,442                | 955.17               | 6,684.90                 | 1,170.80              | 40.96                | 289.33                   | 4.29          |
| 5/KK...  | 21.60                        | 19.47                        | 12,281                | 568.56               | 5,656.44                 | 562.25                | 26.03                | 266.67                   | 4.58          |
| 5/LL...  | 25                           | 22.13                        | 9,585                 | 383.40               | 4,849.66                 | 433.99                | 17.36                | 223.23                   | 4.53          |
| Means    | 26.36                        | 23.36                        | 17,983.48             | 682.33               | 5,712.52                 | 826.37                | 31.35                | 278.17                   | 4.60          |

## LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                       | Butterfat.            |                      |                       | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|
|          |                              |                              | Per Herd during Sept. | Per Cow during Sept. | Per Cow Dec. to Sept. | Per Herd during Sept. | Per Cow during Sept. | Per Cow Dec. to Sept. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                  | Lbs.                  | Lbs.                 | Lbs.                  | %             |
| 6/B...   | 20                           | 18.23                        | 16,045½               | 802.28               | 3,738.85              | 599.69                | 29.98                | 156.53                | 3.74          |
| 6/C...   | 27.80                        | 26.93                        | 23,572                | 817.94               | 5,436.32              | 912.83                | 31.68                | 283.13                | 3.87          |
| 6/E...   | 21                           | 19.67                        | 11,223                | 534.66               | 3,600.94              | 390.48                | 18.59                | 145.27                | 3.48          |
| 6/F...   | 25                           | 24                           | 24,375                | 975.00               | 5,980.65              | 1,131.46              | 45.26                | 278.03                | 4.64          |
| 6/I...   | 17                           | 14.60                        | 10,611                | 624.18               | 3,530.08              | 395.61                | 23.27                | 149.48                | 3.78          |
| 6/Q...   | 22                           | 19.90                        | 12,803½               | 581.98               | 4,382.59              | 563.95                | 25.63                | 208.68                | 4.40          |
| 6/R...   | 23                           | 18                           | 12,045                | 523.69               | 3,107.57              | 647.25                | 28.14                | 167.42                | 5.37          |
| 6/V...   | 26                           | 16.03                        | 7,876                 | 302.92               | 2,547.58              | 321.19                | 12.35                | 106.81                | 4.08          |
| 6/W...   | 25                           | 21.13                        | 14,180                | 563.78               | 4,848.65              | 641.19                | 25.49                | 233.00                | 4.52          |
| 6/X...   | 26.20                        | 18.60                        | 14,881                | 567.97               | 7,473.83              | 603.11                | 23.02                | 300.75                | 4.05          |
| 6/Y...   | 20                           | 15.47                        | 11,614                | 580.70               | 4,180.60              | 488.94                | 24.45                | 181.79                | 4.21          |
| 6/Bb...  | 18                           | 10.53                        | 6,090                 | 338.33               | 2,467.80              | 269.48                | 14.97                | 111.24                | 4.42          |
| 6/DD...  | 31.90                        | 20.80                        | 12,895                | 404.23               | 4,344.41              | 592.29                | 18.57                | 194.13                | 4.59          |
| 6/Ee...  | 48.80                        | 35.40                        | 22,304½               | 457.03               | 5,089.78              | 912.51                | 18.70                | 226.53                | 4.09          |
| 6/Ff...  | 26                           | 18.93                        | 13,983                | 538.00               | 3,981.65              | 583.55                | 22.44                | 175.70                | 4.17          |
| 6/Ii...  | 35.87                        | 22.40                        | 17,237½               | 480.55               | 5,616.65              | 775.82                | 21.63                | 255.89                | 4.60          |
| 6/Jj...  | 21                           | 18.93                        | 10,719½               | 510.45               | 5,650.24              | 468.80                | 22.32                | 263.15                | 4.37          |
| 6/Kk...  | 24.80                        | 16.37                        | 11,168                | 460.41               | 5,496.98              | 443.90                | 18.27                | 239.45                | 3.97          |
| 6/Ll...  | 23.60                        | 16.57                        | 11,524½               | 488.32               | 5,206.94              | 434.17                | 18.40                | 215.05                | 3.77          |
| 6/Mm...  | 15.40                        | 12.98                        | 7,524                 | 488.57               | 4,438.66              | 364.49                | 23.67                | 212.46                | 4.84          |
| 6/Nn...  | 19                           | 18                           | 7,470                 | 393.16               | 3,641.90              | 323.96                | 17.05                | 161.09                | 4.84          |
| 6/Oo...  | 19                           | 17                           | 11,460                | 603.16               | 5,321.69              | 484.78                | 25.51                | 238.23                | 4.23          |
| Means    | 24.36                        | 19.11                        | 13,256.00             | 544.22               | 4,618.16              | 561.84                | 23.05                | 205.46                | 4.23          |



## THE HILLS HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                   |                        |                         | Butterfat.              |                        |                         | Average Test. |
|----------|------------------------------|------------------------------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|---------------|
|          |                              |                              | Per Herd during August. | Per Cow during August. | Per Cow July to August. | Per Herd during August. | Per Cow during August. | Per Cow July to August. |               |
|          |                              |                              | Lbs.                    | Lbs.                   | Lbs.                    | Lbs.                    | Lbs.                   | Lbs.                    | %             |
| 7/D ...  | 26                           | 22-81                        | 17,422½                 | 670-10                 | 1,255-56                | 724-08                  | 27-85                  | 52-09                   | 4-16          |
| 7/E ...  | 28                           | 20-68                        | 16,386½                 | 583-45                 | 1,070-91                | 637-12                  | 22-75                  | 42-65                   | 3-90          |
| 7/H ...  | 7                            | 4-39                         | 4,442½                  | 634-64                 | 1,036-27                | 201-72                  | 28-82                  | 48-11                   | 4-54          |
| 7/J ...  | 19                           | 17-74                        | 8,725                   | 459-21                 | 999-08                  | 417-94                  | 22-00                  | 47-47                   | 4-79          |
| 7/K ...  | 12-97                        | 8-16                         | 6,779½                  | 522-79                 | 942-56                  | 285-71                  | 22-03                  | 40-96                   | 4-21          |
| 7/L ...  | 29-68                        | 14-77                        | 7,413½                  | 249-78                 | 476-02                  | 348-16                  | 11-73                  | 22-91                   | 4-70          |
| 7/O ...  | 18-39                        | 11-58                        | 7,153½                  | 388-99                 | 531-78                  | 380-79                  | 19-62                  | 27-06                   | 5-04          |
| 7/S ...  | 14                           | 13-19                        | 9,608                   | 686-23                 | 1,389-31                | 522-07                  | 37-29                  | 74-59                   | 5-43          |
| 7/T ...  | 10                           | 7-48                         | 5,136½                  | 513-65                 | 857-75                  | 214-30                  | 21-43                  | 35-58                   | 4-17          |
| 7/V ...  | 12                           | 1-90                         | 236                     | 19-67                  | 85-17                   | 13-10                   | 1-09                   | 4-58                    | 5-55          |
| 7/W ...  | 19-10                        | 8-94                         | 6,725                   | 352-09                 | 747-51                  | 306-90                  | 16-07                  | 34-94                   | 4-56          |
| 7/X ...  | 15                           | 10-26                        | 9,910                   | 660-67                 | 1,094-34                | 402-34                  | 28-82                  | 44-27                   | 4-06          |
| 7/Y ...  | 14                           | 8                            | 3,766½                  | 269-03                 | 601-29                  | 179-64                  | 12-83                  | 29-30                   | 4-77          |
| 7/Z ...  | 10                           | 8                            | 4,557                   | 455-70                 | 1,009-25                | 204-37                  | 20-44                  | 44-52                   | 4-48          |
| 7 AA ... | 7                            | 5                            | 2,170                   | 310-00                 | 615-57                  | 108-31                  | 15-47                  | 30-98                   | 4-99          |
| 7 BB ... | 13-26                        | 6-71                         | 5,329½                  | 401-92                 | 767-26                  | 178-40                  | 13-45                  | 30-22                   | 3-35          |
| 7 DD ... | 10-06                        | 7-94                         | 6,462                   | 642-34                 | 1,008-64                | 315-43                  | 31-35                  | 50-62                   | 4-88          |
| 7 EE ... | 28                           | 21-06                        | 8,356                   | 298-43                 | 629-33                  | 344-28                  | 12-30                  | 26-69                   | 4-12          |
| 7 FF ... | 11                           | 8-87                         | 10,521½                 | 956-50                 | 1,391-96                | 451-35                  | 41-03                  | 59-28                   | 4-29          |
| 7 GG ... | 11-84                        | 8-03                         | 3,504                   | 296-25                 | 445-80                  | 172-91                  | 14-60                  | 23-75                   | 4-97          |
| 7 HH ... | 17                           | 14-94                        | 9,030                   | 531-18                 | 988-62                  | 381-31                  | 22-43                  | 41-31                   | 4-22          |
| 7 II ... | 11-03                        | 10-08                        | 6,923                   | 627-64                 | —                       | 327-45                  | 29-69                  | —                       | 4-73          |
| Means .  | 15-65                        | 10-93                        | 7,295-82                | 466-15                 | 860-06                  | 322-62                  | 20-61                  | 38-47                   | 4-42          |

## A NEW WEED (*NESLIA PANICULATA*).

[By WORSLEY C. JOHNSTON, Agricultural Instructor.]

The Roseworthy Branch of the Agricultural Bureau recently devoted a meeting to "Weeds, their Identification and Control," and among the specimens tabled by members was a cruciferous plant of the "mustard" type which was unknown to the writer.

Subsequently, with the assistance of Mr. A. J. Adams, M.A., of Roseworthy College, the weed was identified as *Neslia paniculata* (L.) Desv., and this identification was afterwards confirmed by Mr. J. G. Wood, M.Sc., Lecturer on Botany at the Adelaide University, and by Mr. E. W. Pritchard, Dip.Econ., Botanical Assistant to the Department of Agriculture. As no record could be found of its previous occurrence in South Australia, it was deemed expedient that its presence in this State should be announced.

The plant is of Mediterranean origin, and appears to be well known in North American wheat fields, where it goes under the name of "Ball Mustard," due, no doubt, to the shape of its seedpods.

The weed is a free grower, and if not controlled is capable of becoming a nuisance in cereal crops and causing great inconvenience in harvesting operations. Being similar to many of our already numerous "mustards," the method adopted for their control will be sufficient for this particular species.

Its distribution is by no means definitely known, but it has been found in the yard of the Roseworthy Railway Station, and it extends some two miles in an easterly direction and about a mile and a half north and south.

The plant is covered with stiff minute hairs which give it a rough, harsh feeling, thus making it most unpalatable to all forms of livestock.





A New Weed (*Neslia paniculata*).



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.  
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending October 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|--------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                    | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                      | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 68                                     | (5) 99                  | (6) *                   | 167     |
| Williams, W. R. ....     | Frewville .....     | (7) 111                                    | (8) 134                 | (9) 171                 | 416     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 137                                   | (11) 122                | (12) *                  | 259     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 130                                   | (14) 163                | (15) *                  | 283     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 88                                    | (17) *                  | (18) *                  | 88      |
| Pearman, E. D. ....      | Rosewater .....     | (19) 124                                   | (20) 119                | (21) 115                | 358     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                     | (23) *                  | (24) 120                | 120     |
| Burton, C. J. C. ....    | Mallala .....       | (25) 140                                   | (26) 126                | (27) 136                | 402     |
| Heath, H. E. ....        | Mile End .....      | (28) 138                                   | (29) *                  | (30) 115                | 253     |
| Heath, H. E. ....        | Mile End .....      | (31) 116                                   | (32) 94                 | (33) 108                | 318     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 103                                   | (35) 123                | (36) 134                | 360     |
| Howard, T. W. ....       | Woodville .....     | (37) 129                                   | (38) 93                 | (39) 122                | 344     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                     | (41) 132                | (42) 117                | 249     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 86                                    | (44) 143                | (45) 125                | 354     |
| Gameau, V. F. ....       | Woodville .....     | (46) 128                                   | (47) 122                | (48) 86                 | 336     |
| Gameau, V. F. ....       | Woodville .....     | (49) 126                                   | (50) 82                 | (51) 119                | 327     |
| Aird, J. R. & Son ....   | Kilkenny .....      | (52) 102                                   | (53) 126                | (54) 138                | 366     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                     | (56) 109                | (57) *                  | 109     |
| Barrett, L. ....         | Angaston .....      | (58) 95                                    | (59) 103                | (60) 120                | 318     |
| Barrett, L. ....         | Angaston .....      | (61) *                                     | (62) 65                 | (63) 135                | 200     |
| Barrett, L. ....         | Angaston .....      | (64) 108                                   | (65) 80                 | (66) 91                 | 279     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 94                                    | (68) 71                 | (69) 136                | 301     |
| Wiese, W. ....           | Cabra .....         | (70) 152                                   | (71) 135                | (72) 125                | 412     |
| Wiese, W. ....           | Cabra .....         | (73) 137                                   | (74) 133                | (75) 116                | 386     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 126                                   | (77) 118                | (78) 121                | 365     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                     | (80) †                  | (81) 121                | 121     |
| Riggs, N. ....           | Camden Park .....   | (82) 156                                   | (83) 125                | (84) *                  | 281     |
| Riggs, N. ....           | Camden Park .....   | (85) 144                                   | (86) 104                | (87) 123                | 371     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 125                                   | (89) 143                | (90) 144                | 412     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 100                                   | (92) 127                | (93) 142                | 369     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                     | (95) 110                | (96) *                  | 110     |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 146                                   | (98) 122                | (99) *                  | 268     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 141                                  | (101) 52                | (102) *                 | 193     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 112                                  | (104) *                 | (105) *                 | 112     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 90                                   | (107) 104               | (108) 127               | 321     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 124                                  | (110) 167               | (111) *                 | 281     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 142                                  | (113) 117               | (114) *                 | 259     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 117                                  | (116) 115               | (117) 115               | 347     |
| Hill, W. ....            | Knoxville .....     | (118) 131                                  | (119) 128               | (120) 124               | 383     |
| Hill, W. ....            | Knoxville .....     | (121) 130                                  | (122) 126               | (123) 122               | 378     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 105                                  | (125) *                 | (126) 91                | 196     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                    | (128) 126               | (129) 124               | 260     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 42                                   | (131) 124               | (132) 129               | 295     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 115                                  | (134) 140               | (135) 147               | 402     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 146                                  | (137) 135               | (138) 122               | 403     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 141                                  | (140) 111               | (141) 82                | 334     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.             | Address.            | Score for Month ended October<br>31st, 1930. |                               |                               |         |
|--------------------------|---------------------|----------------------------------------------|-------------------------------|-------------------------------|---------|
|                          |                     | Bird No.<br>and Eggs<br>Laid.                | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Compton, R. C. ....      | Woodeforde .....    | (142) 82                                     | (143) 131                     | (144) 122                     | 335     |
| Connor, D. C. ....       | Gawler .....        | (145) 83                                     | (146) 112                     | (147) 87                      | 282     |
| Robinson, A. E. ....     | Hectorville .....   | (148) 156                                    | (149) 135                     | (150) 135                     | 426     |
| Vann, R. S. ....         | New Hindmarsh ...   | (151) 111                                    | (152) 93                      | (153) 88                      | 292     |
| McLean, J. G. ....       | Black Forest .....  | (154) 80                                     | (155) 69                      | (156) 104                     | 253     |
| Fidge, H. ....           | Clarence Park ..... | (157) 97                                     | (158) 95                      | (159) *                       | 192     |
| Fidge, H. ....           | Clarence Park ..... | (160) 79                                     | (161) 95                      | (162) 134                     | 308     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (163) 145                                    | (164) 77                      | (165) *                       | 222     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (166) 136                                    | (167) 82                      | (168) 129                     | 347     |
| Monkhouse, A. J. ....    | Woodside .....      | (169) 117                                    | (170) 128                     | (171) *                       | 245     |
| Monkhouse, A. J. ....    | Woodside .....      | (172) *                                      | (173) *                       | (174) 116                     | 116     |
| Monkhouse, A. J. ....    | Woodside .....      | (175) 114                                    | (176) *                       | (177) *                       | 114     |
| Monkhouse, A. J. ....    | Woodside .....      | (178) *                                      | (179) *                       | (180) 87                      | 87      |
| Sage, H. R. ....         | Nuriootpa .....     | (181) 86                                     | (182) *                       | (183) 128                     | 214     |
| Mitchell, W. J. ....     | Woodside .....      | (184) 131                                    | (185) *                       | (186) 153                     | 284     |
| George, L. E. ....       | Redfern .....       | (187) 143                                    | (188) 148                     | (189) 107                     | 398     |
| George, L. E. ....       | Redfern .....       | (190) 139                                    | (191) 125                     | (192) *                       | 264     |
| George, L. E. ....       | Redfern .....       | (193) 103                                    | (194) 134                     | (195) 134                     | 371     |
| George, L. E. ....       | Redfern .....       | (196) 115                                    | (197) 137                     | (198) 147                     | 399     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (199) 134                                    | (200) 130                     | (201) *                       | 264     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (202) 110                                    | (203) 93                      | (204) 99                      | 302     |
| Gameau, V. F. ....       | Woodville .....     | (205) 118                                    | (206) 99                      | (207) 106                     | 323     |
| Totals .....             | .....               | 6,924                                        | 6,541                         | 6,039                         | 19,504  |

*Section 3.—Black Orpingtons.*

| Competitors.             | Address.            | Score for Month ending October<br>31st, 1930. |                               |                               |         |
|--------------------------|---------------------|-----------------------------------------------|-------------------------------|-------------------------------|---------|
|                          |                     | Bird No.<br>and Eggs<br>Laid.                 | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Aird, J. R., & Son ..... | Kilkenny .....      | (208) 113                                     | (209) 96                      | (210) 121                     | 330     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (211) 95                                      | (212) 119                     | (213) *                       | 214     |
| Williams, W. R. ....     | Frewville .....     | (214) 116                                     | (215) 131                     | (216) 122                     | 369     |
| Williams, W. R. ....     | Frewville .....     | (217) †                                       | (218) *                       | (219) 99                      | 99      |
| Gurr, A. and H. ....     | Scott's Creek ..... | (220) *                                       | (221) *                       | (222) *                       | —       |
| Andrewartha, A. ....     | Underdale .....     | (223) *                                       | (224) 136                     | (225) 137                     | 273     |
| McFarlane, A. S. ....    | Kilkenny .....      | (226) 139                                     | (227) 129                     | (228) 122                     | 390     |
| Connor, D. C. ....       | Gawler .....        | (229) *                                       | (230) 121                     | (231) *                       | 121     |
| Gillick, W. J. ....      | New Hindmarsh ...   | (232) 87                                      | (233) *                       | (234) *                       | 87      |
| Osborn, E. L. ....       | Camden .....        | (235) 103                                     | (236) 126                     | (237) 124                     | 353     |
| Totals .....             | .....               | 653                                           | 858                           | 725                           | 2,236   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.            | Score for Month ending October<br>31st, 1930. |                               |                               |         |
|--------------------|---------------------|-----------------------------------------------|-------------------------------|-------------------------------|---------|
|                    |                     | Bird No.<br>and Eggs<br>Laid.                 | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Gameau, V. F. .... | Woodville .....     | (238) 103                                     | (239) 113                     | (240) 69                      | 285     |
| Fidge, H. ....     | Clarence Park ..... | (241) 123                                     | (242) 119                     | (243) 82                      | 324     |
| Totals .....       | .....               | 226                                           | 232                           | 151                           | 609     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



# STATE OF SOUTH AUSTRALIA.—AGRICULTURAL STATISTICS.

[By W. L. JOHNSTON (Government Statist).]

## TRACTORS AND ENGINES ON FARMS.

### 1. Tractors on Farms in Each Division of the State and Total Engines (Portable and Other).

| Divisions of State.          | 1930.         |            | 1929.         |            | Increase.     |            |
|------------------------------|---------------|------------|---------------|------------|---------------|------------|
|                              | No.           | Total H.P. | No.           | Total H.P. | No.           | Total H.P. |
| TRACTORS.                    |               |            |               |            |               |            |
| Central .....                | 1,079         | 26,290     | 863           | 21,095     | 216           | 5,195      |
| Lower North .....            | 1,055         | 26,815     | 908           | 23,749     | 147           | 3,066      |
| Upper North .....            | 301           | 6,512      | 232           | 5,505      | 69            | 1,007      |
| South-Eastern .....          | 188           | 4,489      | 133           | 3,191      | 55            | 1,298      |
| Western .....                | 721           | 18,406     | 535           | 13,728     | 186           | 4,678      |
| Murray Mallee .....          | 369           | 9,274      | 300           | 7,279      | 69            | 1,995      |
| Outside Divisions ....       | 17            | 458        | 8             | 236        | 9             | 218        |
| Total State .....            | 3,730         | 92,240     | 2,979         | 74,783     | 751           | 17,457     |
|                              | Average 24.73 |            | Average 25.10 |            | Average -0.37 |            |
| ENGINES (Portable and other) |               |            |               |            |               |            |
| Total State .....            | 13,922        | 75,058     | 13,265        | 70,877     | 657           | 4,381      |
|                              | Average 5.39  |            | Average 5.33  |            | Average 0.06  |            |

### 2. Tractors Classified as to H.P.

| Year.                 | Under 10 H.P. | 11-15 H.P. | 16-25 H.P. | Over 25 H.P. | Total. |        |          |
|-----------------------|---------------|------------|------------|--------------|--------|--------|----------|
|                       |               |            |            |              | No.    | H.P.   | Average. |
| 1924-25 ...           | 77            | 94         | 443        | 268          | 882    | 19,335 | 21.92    |
| 1925-26 ...           | 95            | 105        | 619        | 433          | 1,252  | 28,254 | 22.57    |
| 1926-27 ...           | 109           | 152        | 829        | 730          | 1,820  | 41,807 | 22.97    |
| 1927-28 ...           | 124           | 162        | 1,077      | 1,140        | 2,503  | 60,253 | 24.07    |
| 1928-29 ...           | 135           | 182        | 1,294      | 1,368        | 2,979  | 74,783 | 25.10    |
| 1929-30 ...           | 145           | 247        | 1,630      | 1,708        | 3,730  | 92,240 | 24.73    |
| Increase in 5 years . | 68            | 153        | 1,187      | 1,440        | 2,848  | 72,905 | 2.81     |



## ACREAGE UNDER CROP OF ALL KINDS.

| Crop.                                     | Season<br>1929-30. | Season<br>1928-29. | Increase,<br>1929-30. | Mean of 5<br>Seasons to<br>1928-29. |
|-------------------------------------------|--------------------|--------------------|-----------------------|-------------------------------------|
|                                           | Acres.             | Acres.             | Acres.                | Acres.                              |
| Cereals—                                  |                    |                    |                       |                                     |
| Wheat .. . . . . .                        | 3,645,764          | 3,445,563          | 200,201               | 2,824,165                           |
| Barley—                                   |                    |                    |                       |                                     |
| Malting .. . . . . .                      | 287,900            | 234,958            | 52,942                | 212,214                             |
| Cape .. . . . . .                         | 17,416             | 12,390             | 5,026                 | 13,613                              |
| Total Barley .. . . . . .                 | 305,316            | 247,348            | 57,968                | 225,827                             |
| Oats .. . . . . .                         | 277,923            | 207,266            | 70,657                | 173,949                             |
| Maize .. . . . . .                        | —                  | —                  | —                     | 2                                   |
| Rye .. . . . . .                          | 653                | 688                | —35                   | 426                                 |
| Total Cereals .. . . . . .                | 4,229,656          | 3,900,865          | 328,791               | 3,224,369                           |
| Grass Seed .. . . . . .                   | 1,991              | 1,300              | 691                   | 788                                 |
| Hay—                                      |                    |                    |                       |                                     |
| Wheaten .. . . . . .                      | 318,239            | 270,805            | 47,434                | 273,525                             |
| Oaten .. . . . . .                        | 212,956            | 218,140            | —5,184                | 238,004                             |
| All Other .. . . . . .                    | 13,243             | 8,593              | 4,650                 | 9,608                               |
| Total Hay .. . . . . .                    | 544,438            | 497,538            | 46,900                | 521,137                             |
| Green Forage .. . . . . .                 | 86,500             | 155,460            | —68,960               | 124,233                             |
| Peas and Beans .. . . . . .               | 13,487             | 14,244             | —757                  | 15,393                              |
| Orchards—                                 |                    |                    |                       |                                     |
| In Bearing .. . . . . .                   | 26,355             | 26,888             | —533                  | 26,868                              |
| Not Bearing .. . . . . .                  | 3,718              | 3,948              | —230                  | 4,929                               |
| Total Orchards .. . . . . .               | 30,073             | 30,836             | —763                  | 31,797                              |
| Vineyards—                                |                    |                    |                       |                                     |
| Wine Grapes .. . . . . .                  | 33,180             | 32,446             | 734                   | 30,789                              |
| Table Grapes .. . . . . .                 | 586                | 600                | —14                   | 732                                 |
| Drying Grapes .. . . . . .                | 18,563             | 18,756             | —193                  | 19,201                              |
| In Bearing .. . . . . .                   | 48,790             | 48,209             | 581                   | 46,174                              |
| Not Bearing .. . . . . .                  | 3,539              | 3,593              | —54                   | 4,548                               |
| Total Vineyards .. . . . . .              | 52,329             | 51,802             | 527                   | 50,722                              |
| Root Crops—                               |                    |                    |                       |                                     |
| Potatoes .. . . . . .                     | 4,536              | 4,518              | 18                    | 3,712                               |
| Onions .. . . . . .                       | 452                | 406                | 46                    | 384                                 |
| Other Root Crops .. . . . . .             | 610                | 562                | 48                    | 490                                 |
| Total Root Crops .. . . . . .             | 5,598              | 5,486              | 112                   | 4,586                               |
| Market Gardens .. . . . . .               | 1,658              | 1,408              | 250                   | 1,425                               |
| Pumpkins and Melons .. . . . . .          | 314                | 338                | —24                   | 282                                 |
| Tomatoes .. . . . . .                     | 635                | 505                | 130                   | 504                                 |
| Other Crops .. . . . . .                  | 237                | 220                | 17                    | 236                                 |
| Total Crops .. . . . . .                  | 4,966,916          | 4,660,002          | 306,914               | 3,975,472                           |
| Crops per Head of Population .. . . . . . | 8.56               | 8.04               | 0.52                  | 7.07                                |



## ARTIFICIAL MANURES.

During the last 10 seasons the quantity of artificial manures used has increased 94 per cent. Of the total area cropped in 1919-20, 84 per cent. was artificially manured, 93,091 tons of artificial manure being used. In 1929-30 the respective figures were 93 per cent. and 181,045 tons.

1. *Total Manures Used on Cropped Area, 1929-30.*

| Division.           | Area<br>Cropped. | Area<br>Manured. | Per cent.<br>Manured<br>to Cropped. | Manure Used. |                      |
|---------------------|------------------|------------------|-------------------------------------|--------------|----------------------|
|                     |                  |                  |                                     | Total.       | Average<br>per Acre. |
|                     | Acres.           | Acres.           | %                                   | Tons.        | Lbs.                 |
| Central .....       | 1,045,127        | 953,814          | 91.24                               | 49,999       | 117.45               |
| Lower North .....   | 1,030,633        | 992,411          | 96.29                               | 40,416       | 91.22                |
| Upper North .....   | 287,343          | 228,458          | 79.51                               | 8,004        | 78.48                |
| South Eastern ..... | 129,935          | 110,695          | 85.19                               | 5,920        | 119.80               |
| Western .....       | 1,235,587        | 1,162,698        | 94.10                               | 36,513       | 70.34                |
| Murray Mallee ..... | 1,238,291        | 1,152,384        | 93.06                               | 40,193       | 78.13                |
| Total 1929-30 ..... | 4,966,916        | 4,600,260        | 92.62                               | 181,045      | 88.16                |
| Total 1928-29 ..... | 4,660,003        | 4,251,348        | 91.23                               | 171,965      | 90.60                |

2. *Percentage of Cropped Area Manured.*

| Year.        | Whole State.     |                                  | Divisions. |                 |                 |                  |        |                   |
|--------------|------------------|----------------------------------|------------|-----------------|-----------------|------------------|--------|-------------------|
|              | Area<br>Manured. | Per Cent. to<br>Cropped<br>Area. | Central.   | Lower<br>North. | Upper<br>North. | South-<br>Eastn. | Westn. | Murray<br>Mallee. |
|              | Acres.           | %                                | %          | %               | %               | %                | %      | %                 |
| 1919-20 ..   | 2,572,277        | 84.1                             | 89.3       | 92.9            | 65.7            | 69.5             | 72.4   | 86.4              |
| 1924-25 ..   | 3,099,889        | 87.1                             | 88.1       | 90.5            | 78.5            | 71.1             | 86.0   | 87.2              |
| 1925-26 ..   | 3,195,861        | 89.2                             | 90.1       | 91.7            | 80.2            | 73.6             | 88.5   | 90.2              |
| 1926-27 ..   | 3,533,868        | 91.0                             | 91.4       | 91.7            | 82.3            | 74.2             | 92.0   | 93.4              |
| 1927-28 ..   | 3,815,419        | 91.0                             | 92.0       | 92.1            | 78.5            | 77.7             | 91.2   | 94.1              |
| 1928-29 ..   | 4,251,348        | 91.2                             | 90.3       | 93.4            | 77.0            | 82.9             | 92.9   | 93.3              |
| 1929-30 ..   | 4,600,260        | 92.6                             | 91.2       | 96.3            | 79.5            | 85.2             | 94.1   | 93.1              |
| Inc. 10 yrs. | 2,027,983        | 8.5                              | 1.9        | 3.4             | 13.8            | 15.7             | 21.7   | 6.7               |

3. *Average Quantity Artificial Manure Used Per Acre.*

| Year.        | Whole State.    |                      | Divisions. |                  |                 |                  |        |                   |
|--------------|-----------------|----------------------|------------|------------------|-----------------|------------------|--------|-------------------|
|              | Manure<br>Used. | Average<br>per Acre. | Central.   | Lower.<br>North. | Upper<br>North. | South-<br>Eastn. | Westn. | Murray<br>Mallee. |
|              | Tons.           | Lbs.                 | Lbs.       | Lbs.             | Lbs.            | Lbs.             | Lbs.   | Lbs.              |
| 1919-20 ..   | 93,091          | 81.1                 | 107.2      | 82.6             | 66.1            | 96.4             | 56.0   | 60.5              |
| 1924-25 ..   | 124,264         | 89.8                 | 115.7      | 90.0             | 82.5            | 110.8            | 64.8   | 76.7              |
| 1925-26 ..   | 130,217         | 91.3                 | 114.9      | 92.0             | 80.8            | 115.4            | 67.0   | 82.0              |
| 1926-27 ..   | 146,910         | 93.1                 | 116.8      | 94.6             | 77.9            | 118.3            | 70.6   | 85.8              |
| 1927-28 ..   | 157,183         | 92.3                 | 116.7      | 95.4             | 75.7            | 115.7            | 72.5   | 84.0              |
| 1928-29 ..   | 171,965         | 90.6                 | 118.1      | 93.8             | 70.9            | 122.9            | 71.9   | 80.5              |
| 1929-30 ..   | 181,045         | 88.2                 | 117.5      | 91.2             | 78.5            | 119.8            | 70.3   | 78.1              |
| Inc. 10 yrs. | 87,954          | 7.1                  | 10.3       | 8.6              | 12.4            | 23.4             | 14.3   | 17.6              |

*Top-Dressed Pastures.*—In addition to the foregoing, 15,701 tons were used on 302,114 acres for top dressing. For details, see October (1930) *Journal*, page 252.



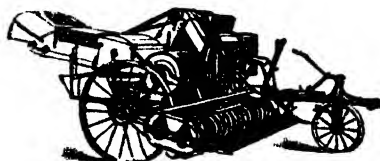
## WHEAT PRODUCTIVITY CLASSIFICATION, 1929-30.

With a view to ascertaining the extent of acreage producing very high and very low average returns of wheat per acre, the Government Statist has classified all wheat farms according to their productivity per acre. The accompanying return sets forth comparative details for the three seasons—1926-27, 1928-29, and 1929-30.

The total yields and averages per acre for the State for these seasons and the rainfall (April-November) were respectively 35,558,711bush., average 12.84bush., rainfall 13.40in.; 26,826,094bush., average 7.79bush., rainfall 9.39in.; 23,345,093bush., average 6.40bush., rainfall 9.57in.

Yet 2,896, 1,673, and 1,688 farmers reaped 18bush. and upwards per acre, producing 34.24 per cent., 19.69 per cent., and 27.39 per cent. of the total wheat crop from 20.14 per cent., 6.94 per cent., and 7.65 per cent. of the total area sown. The effect of the dry seasons of 1928-29 and 1929-30 is seen in the lower figures for high yields.

One of the profitable results of this analysis is the recording of the large number of farmers in all divisions of the State who succeed in getting returns from 18bush. to well over 33bush. per acre, and also the unduly large number who have reaped less than 3bush., 6bush., and 9bush., even in the best divisions of the State, thus bringing down the general average. These facts indicate the possibility in normal seasons of obtaining from a greater number of farms increased average returns per acre from the already settled wheat areas, with a consequent substantial increase in the aggregate for the State.

**THE SUNSHINE HEADER HARVESTER****HARVESTS ALL THE GRAIN POSSIBLE!!****— FROM ALL CLASSES OF CROPS!! —**

Sizes—6ft., 8ft., 10ft. cut.

**Works equally well in light or down and tangled crops.****Price, Terms, and Illustrated Catalogue on application.****H. V. McKAY Pty. Ltd.,** 95-97, North Terrace,  
**ADELAIDE.**







## ADVISORY BOARD OF AGRICULTURE.

A meeting of the Advisory Board of Agriculture was held at the Roseworthy Agricultural College, when the following members were present:—Messrs. F. Coleman (Chairman), P. H. Jones, A. M. Dawkins, H. S. Taylor, S. Shepherd, A. L. McEwin, Professor Perkins (Director of Agriculture), W. R. Birks (Principal Roseworthy College), and H. C. Pritchard (Secretary).

Apologies were received from Messrs. Geo. Jeffrey, R. H. Martin, J. W. Sandford, and A. J. Cooke.

*Experimental Plots in Semi-Arid Areas.*—The Director of Agriculture reported that arrangements had been made to conduct experiments in semi-arid areas on the property of Mr. A. J. Bartlett, Willowie.

*Water Meter Readings.*—The Secretary reported that the resolution of the Upper North Conference requesting that meter readings be posted to landowners, had been submitted to the Commissioner of Public Works, who had decided that owing to the extra cost involved the request would not be granted, but district engineers in country centres had been instructed to place the readings in letter-boxes where such were conveniently available.

*Dairy Cattle Improvement.*—The decision of the Dairy Advisory Committee that it was unable to support the request of the Southern Conference to alter the Act for the purpose of having bulls registered at nine months old instead of six months was received.

*Boxthorn and Wild Melon.*—It was decided, in accordance with a letter received from the Executive Committee of the Local Government Association, to bring under the notice of the Langhorne's Creek Branch that the Southern Conference resolution concerning boxthorn and wild melon should be referred to the Local Government Association through a district council.

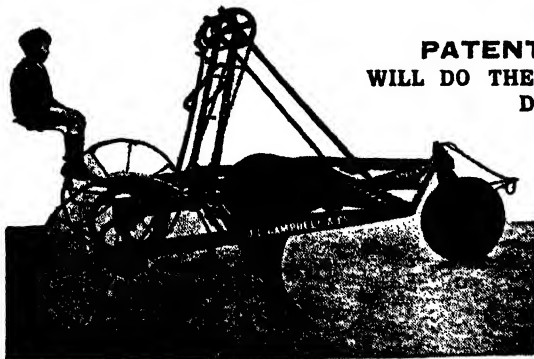
*Press Reports.*—The following resolution of the Redhill Branch (dated August 5th) was read:—"That this Branch is of opinion that the associated papers are not publishing unbiased opinions of reports concerning primary producers, and we request that the Board bring this under the notice of all Branches throughout the State, or we request this to be published through the *Journal of Agriculture*." It was decided to forward a copy of the resolution to the associated papers.

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PATENT SCRUB RAKE

WILL DO THE WORK OF 15 MEN, AND  
DO IT BETTER.



Scrub Rollers, Fire Rakes (all sizes), Tubular Sack Trucks and Bag Elevators, Wheelbarrows, Earth Scoops, Etc.

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CLOVER RAKES.

—o—

ALL PARTICULARS FROM—

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147, CURRIE STREET, ADELAIDE, SOUTH AUSTRALIA.



*Fruit Buds of Apple Trees.*—Hills Conference resolution—"That the Waite Agricultural Research Institute be requested to initiate research work into the development of the fruit buds in the apple, with a view to determining as to what period the wood bud changes into the fruit bud." It was decided to refer this matter to the Chief Horticultural Instructor for a report as to whether any information is already available.

*Controlling Fruit Crops.*—Hills Conference resolution—"That steps be taken to investigate the possibility of controlling fruit crops by systematic manuring." It was decided to refer this to the Chief Horticultural Instructor for report.

*Destruction of Foxes.*—Hills Conference resolution—"That this Conference requests that considering the damage done by the fox, the month of March be set aside for the simultaneous destruction of foxes, and that it be an offence to liberate any fox." It was decided to refer this to the Minister for consideration under the Vermin Act, and that the month of February be added in the resolution.

*Sugar Industry.*—Hills Conference resolutions:—(a) "That this Conference heartily supports the action taken by the Fruitgrowers' and Market Gardeners' Association in their efforts to bring about a better position from the fruitgrowing point of view in the sugar industry"; (b) "That this Conference emphatically disapproves of the present agreement between the Commonwealth Government and the Queensland sugar interests, and strongly urges that the agreement be not renewed"; (c) "that the Advisory Board of Agriculture be requested to bring the foregoing resolutions under the notice of the Sugar Inquiry Committee appointed by the Prime Minister." It was decided to forward the resolutions to the Minister with the indorsement of the Board. Mr. Taylor voted against this motion, as he was of opinion that the resolutions should not receive the Board's endorsement. The Secretary was instructed to inform the Longwood Branch that no action would be taken with the request that a circular be sent to Branches urging them to bring the foregoing resolutions pointedly before the Federal members representing South Australia. Any action in this respect must be taken by the Branch itself.

*Opossums.*—Hills Conference resolution—"That there be no open season for opossums and that landholders be the only persons allowed to take opossums on their own property." On account of the damage which is done to lambing flocks during the open seasons for opossums it was decided to request that the opinion of the Inspector under the Animals and Birds Protection Acts be obtained on the above resolution.

*Advisory Committees.*—Hills Conference resolution—"That Branches of the Agricultural Bureau form Advisory Committees to advise new settlers coming into the district of the capabilities of land which they intend to take up." It was decided to refer this matter to next Congress so that all Branches would be able to express their views on the matter.

*Gumosis in Apricots.*—Hills Conference resolution—"That results of investigations into the cause of and remedy for gumosis of apricots be made available at the Conference of non-irrigated fruit areas at Angaston in November." The Secretary reported that the Chief Horticultural Instructor had promised to act in accordance with the resolution.

*Fallow Competitions.*—Congress resolution—"That Judges have power to award prizes in fallow competitions without taking moisture content." This was referred to the Competition Committee.

*State Bank at Alawoona.*—Murray Lands Conference resolution—"That this Conference desires to bring to the notice of the authorities the desirability of establishing a Branch of the State Bank at Alawoona at an early date in order to help the development of the district." It was decided to refer this resolution to the State Bank.

*Voting at Conferences.*—Murray Lands Conference resolution—"That at the 1931 Conference each Branch represented appoint two of their members to act as delegates to vote on business matters that come before the Conference." This arrangement received the approval of the Board.



*Cost of Wheat Growing.*—Murray Lands Conference resolution—"That the Department of Agriculture be requested to continue to carry on the work of investigating costs relating to the growing of wheat." It was decided to refer this resolution to the Director of Agriculture for report.

*Division of Conference District.*—Murray Lands Conference resolution—"That the Advisory Board be requested to consider the advisability of dividing the present Murray Mallee Lands Conference District into two Conferences." This received the approval of the Board, and the Secretary was instructed to report on how it is proposed to divide the district.

*Exchange on Cheques.*—Eyre Peninsula (Kimba) Conference—"That this Conference strongly protests against the increased exchange on cheques on Eyre Peninsula." In connection with this resolution, the Secretary read the following letter which was forwarded by the Secretary of the Associated Banks to the Miltalie Branch in July last:—"The banks note the protest of your Society, and regret that they cannot see their way clear to revert to the old rate. I am instructed to advise you that the increased rates apply only as between towns situated on Eyre Peninsula and the remainder of the State; the rates are based on the time it takes to communicate by mail with towns on the West Coast, which involves loss of interest to the banks, and on the increasing cost of maintenance of banking facilities in distant towns. I may point out that South Australia has long enjoyed rates of inland exchange which are less than those ruling in other States. The rate to be charged is 2s. 6d. per cent., with a minimum of 6d. In calculating rates over 6d. amounts of exchange will be calculated to the nearest 3d." It was decided to forward the Conference resolution to the Associated Banks.

*Conferences, Etc., on Public Holidays.*—Eyre Peninsula (Wudinna) Conference resolution—"That the Department of Agriculture be requested not to hold Conferences or Visiting Days at the Experimental Farms on public holidays." The resolution was received and noted for future action.

*Wheat in Second-hand Bags.*—Eyre Peninsula (Wudinna) Conference Resolution—"That this Conference requests the Advisory Board of Agriculture to approach the wheat merchants with a request to allow farmers to sell their wheat in good sound second-hand bags." It was decided not to take any further action in this matter.

*Price of Super.*—Eyre Peninsula (Wudinna) Conference resolution—"That Branches on Eyre Peninsula co-operate in an endeavor to present a request to superphosphate manufacturers and distributors on Eyre Peninsula to allow farmers a reduction in the price of super of the amount of commission paid to agents, provided that farmers sent in their orders direct to manufacturers." At the request of members Mr. Shepherd promised to furnish a report to the Board.

## **SUMMER FODDER CROPS**

Now is the time to sow

**SUDAN GRASS, MAIZE, MILLET, SORGHUM,  
LUCERNE, &c.**

— New Seed now Available —

**Charles Whiting & Chambers Ltd.**  
**13, PITT STREET, ADELAIDE.**



*Climatological Station at Wudinna.*—Eyre Peninsula (Wudinna) Conference resolution—"That this Conference desires to have Wudinna reinstalled as a climatological station." Referred to the Meteorological Department.

*Journal of Agriculture Subscription.*—The Secretary reported that in accordance with a resolution of the 1929 Congress, the Minister had approved of a charge of 2s. 6d. (half of the usual rate) being made to members of Branches. This arrangement dated from August 1st, and Branches have been advised that all members on the roll at that date must subscribe if they desire to receive the *Journal*. Applications for membership after the above date must be accompanied by the subscription fee, unless the nominee is a member of a family and living in the same house as a subscriber. As the *Journal* volume begins in August, the rates will be 2s. 6d. for nominations submitted from August to January, and 1s. 6d. from February to July. Life members and Branch Secretaries will be exempt from payment.

*Alteration in Name of Branch.*—The Board approved of the alteration of the name of the "Boor's Plains and Thrington" Branch to "Boor's Plains."

*New Branches.*—Approval was given to the formation of the following new Branches and foundation members respectively:—*Parrakie (Women's)*—Mesdames V. Hamdorf, Threadgold, E. Isaacson, R. Hamilton, W. Watts, F. Gravestocks, Young, A. J. Beelitz, G. Tape, H. Cabot, N. Catford, A. Lahne, J. Ferme, M. J. White, and Misses L. Beelitz and D. Hamilton; *Waddikee Rocks*—Messrs. J. W. Darby, H. C. Matthews, J. C. Higgins, C. Schumacher, H. Lavery, C. Chapman, D. F. Yares, W. V. Richardson, and E. J. Hier.

*Life Member.*—Life Membership of the Agricultural Bureau was conferred on Mr. J. M. Souter, Wirrulla.

*New Members.*—The undermentioned were approved as members of the following Branches:—*Morchard*—F. Mills; *Pinnaroo*—I. Edwards; *Tweedvale*—W. Efdmann; *Upper Wakefield*—R. Michael, B. Healey, J. Kiley, M. Kiley, jun., J. J. Ellery, F. Neumann, L. Neumann, A. Schultz, J. Simon; *Springton*—R. C. Royal; *Overland Corner*—F. Suter; *Millicent*—W. P. Merten; *Paskeville*—G. E. Meier; *Rendelsham*—A. Orchard, H. Carthow; *Owen*—C. Baker; *Greenock*—C. Grossman, A. Arnold, C. C. Werfel, G. Schluter; *Maramba*—W. Plant, A. W. Jarrett; *Wallala*—C. Hortop, J. Lewis; *Wirrilla*—R. F. Kelly, G. Pulford; *Gladstone*—W. C. Roberts; *Wepewie*—H. W. Noske; *McLaren Flat*—R. Spriggs; *Tantanoola*—L. J. C. Osborne; *Pygery*—F. J. Brown; *Bowhill*—L. E. Tolhurst, W. H. Smith; *Koolunga*—E. T. Bentley; *Rosedale*—W. Cooper, C. Grimmett, A. Lehmann, C. Lienert; *Kalyan*—J. Sherrah; *Truro*—A. C. Tuckwell; *Blackwood*—G. A. Morphet; *Paruna*—A. E. Stribbles; *Netherton*—C. Krueger, E. R. Krueger; *MacGillivray*—W. H. Kent, W. Cooksley; *Blyth*—T. Williams, F. J. Clarke, R. Jones; *Pinnaroo Women's*—Mrs. C. O'Loughlin; *Maltee*—V. Schwarz, P. Schwarz, J. Kerin; *Wolseley*—W. Nethercott, G. Nicholls; *Wandearah*—J. W. Eagle; *Pinkawillinie*—S. W. Sampson, L. Carlson, J. Rohrlach; *Pinnaroo*—K. J. Edwards; *Renmark*—F. Townsend, J. Price, K. G. L. Vorwer; *Parilla Well Women's*—Miss Snelling; *Owen*—A. G. Bowyer; *Riverton*—Mr. R. Longbottom.

*Federal Disabilities Committee.*—The Chairman and Mr. A. I. McEwin were appointed to confer with the South Australian Committee on Federal Disabilities in the matter of arranging for witnesses and evidence to be tendered before the Commonwealth Joint Committee on Public Accounts in its inquiry on South Australia's disabilities under Federation.

*Delays in Drought Relief Payments.*—In reply to the resolution of the Upper North Conference on the question of delays in making payments for goods supplied under drought relief, a report from the Department indicated that delays were caused through certain forms not being received and through an error in names being submitted in connection with one of the payments.



*Closing of Experimental Farms.*—The following resolutions were read:—(a) Murray Lands Conference—"That this Conference views with alarm the press reports that there is a possibility of the Veitch Experimental Farm being closed, and enters a strong protest against any such action if contemplated by the Government." (b) Eyre Peninsula (Wudinna) Conference—(i.) "That the Government be requested to reconsider the proposal to close the Experimental Farms"; (ii.) "That a petition be presented to the Hon. Minister of Agriculture to carry on the Minnipa Experimental Farm on a commercial basis until such time as the financial position improves." It was decided that the Chairman and Mr. A. M. Dawkins should wait on the Minister to discuss the matter with him.

*Entires for Veitch Farm.*—Murray Lands Conference resolution—"That the Government be asked to secure two entires (Clydesdales) to be stationed at Veitch Experimental Farm, and travel the district." Further action was not taken with regard to this resolution.

*Encouraging the Breeding of Draught Horses.*—Eyre Peninsula (Wudinna) Conference resolution—"That the Government devise some scheme of encouraging the breeding of draught horses in the State." This was referred to the committee appointed to consider a previous resolution on the question of subsidising the purchase of stallions. Mr. A. L. McEwin was added to the personnel of the committee.

*Concession Freights on Flock Rams.*—Eyre Peninsula (Wudinna) Conference resolution—"That the Government be approached to assist the farmers by granting them concession freights on approved flock rams procured for the purpose of building up their flocks." It was decided to refer this to the Railways Commissioner.

*Freight Concessions on Wheat and Super.*—Eyre Peninsula (Wudinna) Conference resolution—"That the South Australian Railways be requested to reduce the freight on wheat and super on the Eyre Peninsula lines by 25 per cent. to compensate for the low price of wheat." To be referred to the Railways Commissioner.

*Pure-bred Cows for Minnipa.*—Eyre Peninsula (Wudinna) Conference resolution—"That the Department of Agriculture be requested to supply two pure-bred milking shorthorn cows to the Minnipa Experimental Farm for the purpose of breeding stock for distribution throughout this and the surrounding districts." Further action on this resolution was deferred.

*Subsidies for Crop Competitions.*—Congress resolution—"That representations be made to the Honorable the Minister of Agriculture requesting that Crop Competition subsidies be continued." Owing to the financial position it was decided not to take further action.

*Marketing of Wheat.*—Congress resolution—"That in view of the keen competition overseas and in order to improve our standard of saleable wheat we believe that the adoption of the system of branding of wheat bags similar to that in Western Australia would prove advantageous to South Australian wheat growers, and that all wheat be marketed on grade instead of the present F.A.Q." The Secretary was instructed to make further inquiries from the West Australian Department of Agriculture in regard to the working of the Act.

*Agricultural Instructors as Judges at Country Shows.*—Congress resolution—"That Instructors of the Department of Agriculture be allowed to judge at Country Shows." In view of the previous decision of the Minister it was decided not to take further action.

*Blackwood Experimental Orchard.*—Hills Conference resolution—"This meeting desires to place on record its appreciation of the good work carried on in the Blackwood Experimental Orchard, and trust that the Government finds sufficient funds to ensure continuity of this work." This resolution was referred to the Minister for his consideration.

Prior to the Board meeting the Principal of the College (Mr. W. R. Birks) conducted members over the science laboratories and several places of interest particularly associated with the experimental work of the institution.



## DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on November 3rd, 1930:—

**BUTTER.**—It is pleasing to record that owing to the continuance of spring rains in October the production of butter has been well maintained, and although the peak period of production has passed, the supplies should keep up well, as there is an abundance of feed in most districts. Values have eased from time to time because of the weakness in the London market, and as considerable shipments go forward each week, values are governed by rates obtainable there. Choicest creamery fresh butter in bulk, 1s. 2½d.; prints and delivery extra; second and third grades, 1s. 0½d. (these prices are subject to the stabilization levies); best separators, 11d. to 1s.; well-conditioned store and collectors', 8½d. to 9½d. per lb.; pastry lots lower.

**EGGS.**—Supplies of eggs have continued heavy, but with this commodity also the flush of the season is passed, and quantities are showing a slight decrease, although there is a considerable surplus still being packed for London and taken up by pulpers and picklers for winter use. Rates have continued fairly steady. Ordinary country lots, hen 5½d. per dozen, duck 6½d. per dozen; guaranteed infertile higher.

**CHEESE.**—There is still a steady improvement in quantities from the South-Eastern factories, and as a surplus is now available over and above local and interstate demands, arrangements are being made to export tonnage to London. Rates are lower than have ruled for many years past, but this applies also to all produce. New makes, large to loaf, 6½d. to 6¾d. per lb.; semi-matured and matured, to 11d. per lb.

**ALMONDS.**—As usual at this time of the year there is not a great quantity of almonds being marketed as the bulk of them has been sold ere this. There is a good demand for all lines, although values eased in Brandis during the past few weeks. Brandis, 7½d. to 8d.; mixed softshells, 7d. to 7½d.; hardshells, 4d. to 4½d.; kernels, 1s. 6d. to 1s. 7d. per lb.

**HONEY.**—The demand for honey is negligible. During the month there was a little hand to mouth trade done in prime clear extracted lines, but lower grades are very difficult to quit even at low prices. Prime clear extracted in liquid condition, 4d. to 4½d.; best quality candied lots, 4d. to 4½d.; second grade, 2d. to 3d. per lb.

**BEESEX.**—Meeting with ready sale and prices are steady; 1s. 4½d. to 1s. 5½d. per lb., according to sample.

**BACON.**—Ample supplies of bacon have been marketed each week, and values have continued fairly steady. There is a good demand now coming in for the Christmas trade, and bacon factory small goods are also in better request. Best local sides, 10½d. to 11d.; best local factory-cured middles, 10½d. to 11½d.; large, 9d.; local rolls, 11d. to 11½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 5d.; local hams, 1s. to 1s. 1d.; Geo. Farmer's "Sugar Cane" brand lard in packets 11d., in bulk 10d.; local lard, 10½d. per lb. in prints.

**LIVE POULTRY.**—The demand for live poultry shows an improvement due to the fact that many purchasers and produce dealers are securing their supplies for Christmas and placing same away in refrigerators; also Broken Hill buyers are operating still, and all lots submitted at the various markets each week have been readily cleared. One or two clearing sales of pure-bred poultry were held on the farms during the month, and were well attended, and satisfactory prices obtained. Prime roosters, 4s. 6d. to 5s. 6d.; nice-conditioned cockerels, 3s. 6d. to 4s. 4d.; fair-conditioned cockerels, 2s. 10d. to 3s. 3d.; chickens lower. Heavy-weight hens, 3s. 6d. to 4s. 3d.; medium hens, 2s. 10d. to 3s. 3d.; light hens, 2s. to 2s. 8d.; couple of pens of weedy sorts lower. Geese, 4s. to 6s.; prime young muscovy drakes, 4s. 9d. to 6s.; ducks, good conditioned, 3s. 9d. to 4s. 6d.; ducks, fair conditioned, 2s. 4d. to 3s. 3d.; ducklings lower. Turkeys, good to prime condition, 11d. to 1s. 2d. per lb. live weight; turkeys, fair condition, 8d. to 10d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 7½d. each.

**POTATOES.**—New Western Australian Delawares, 9s. to 9s. 6d. per cwt.; new locals, 10s. to 10s. 6d. per cwt.; Best South-Eastern and Victorian, 7s. to 8s. per cwt. ●

**ONIONS.**—Best brown, 7s. 6d. per cwt.; new white, 8s. per cwt.



# IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., SEPTEMBER, 1930.

## IMPORTS.

### Interstate.

|                                     |        |
|-------------------------------------|--------|
| Apples (bushels) .. . . .           | 232    |
| Bananas (bushels) .. . . .          | 8,891  |
| Citrus—                             |        |
| Grape fruit (bushels) .. . . .      | 3      |
| Lemons (bushels) .. . . .           | 25     |
| Oranges (bushels) .. . . .          | 22     |
| Passion fruit (bushels) .. . . .    | 428    |
| Pears (bushels) .. . . .            | 7      |
| Pineapples (bushels) .. . . .       | 1,269  |
| Tomatoes (bushels) .. . . .         | 5      |
| Peanuts (bags) .. . . .             | 448    |
| Peanuts, kernels (bags) .. . . .    | 15     |
| Beans (bushel) .. . . .             | 1      |
| Carrots (bags) .. . . .             | 108    |
| Cucumbers (bushels) .. . . .        | 156    |
| Peas (bag) .. . . .                 | 1      |
| Potatoes (bags) .. . . .            | 17,350 |
| Swedes (bags) .. . . .              | 51     |
| Bulbs (packages) .. . . .           | 38     |
| Plants (packages) .. . . .          | 62     |
| Roots, grass (packages) .. . . .    | 4      |
| Seeds (packages) .. . . .           | 88     |
| Trees, fruit (packages) .. . . .    | 108    |
| Wine casks (number) .. . . .        | 2,614  |
| Fumigated—                          |        |
| Trees, fruit (packages) .. . . .    | 85     |
| Wine casks (number) .. . . .        | 28     |
| Rejected—                           |        |
| Bananas (bushels) .. . . .          | 9      |
| Citrus—                             |        |
| Lemons (bushels) .. . . .           | 4      |
| Oranges (bushels) .. . . .          | 2      |
| Potatoes (bags) .. . . .            | 52     |
| Second-hand cases (number) .. . . . | 2      |

### Overseas.

#### (State Law.)

|                              |     |
|------------------------------|-----|
| Wine casks (number) .. . . . | 200 |
|------------------------------|-----|

### Federal Quarantine Act.

|                     | Packages. | Lbs.     |
|---------------------|-----------|----------|
| Seeds, &c. .. . . . | 1,046     | 153,323  |
|                     |           | No.      |
| Plants .. . . .     | 2         | 51       |
|                     |           | Sup. ft. |
| Timber .. . . .     | 70,278    | 968,544  |

## EXPORTS.

### Federal Commerce Act.

|                                         |     |
|-----------------------------------------|-----|
| England—Oranges (packages) .. . . .     | 34  |
| Belgium—Oranges (packages) .. . . .     | 10  |
| Scotland—Oranges (packages) .. . . .    | 12  |
| Germany—Oranges (packages) .. . . .     | 10  |
| Java—Oranges (packages) .. . . .        | 500 |
| New Zealand—Oranges (packages) .. . . . | 100 |
| Seeds (packages) .. . . .               | 88  |
| Plants (package) .. . . .               | 1   |
| U.S.A.—Seeds (package) .. . . .         | 1   |
| India—Apples (packages) .. . . .        | 50  |
| Potatoes (packages) .. . . .            | 10  |



## IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., OCTOBER, 1930.

### IMPORTS.

#### *Interstate.*

|                                      |       |
|--------------------------------------|-------|
| Apples (bushels) . . . . .           | 179   |
| Bananas (bushels) . . . . .          | 7,794 |
| Citrus—                              |       |
| Grape fruit (bushel) . . . . .       | 1     |
| Lemons (bushels) . . . . .           | 117   |
| Oranges (bushels) . . . . .          | 27    |
| Passion fruit (bushels) . . . . .    | 350   |
| Pawpaws (bushel) . . . . .           | 1     |
| Pineapples (bushels) . . . . .       | 390   |
| Cane, sugar (bushels) . . . . .      | 16    |
| Peanuts (bags) . . . . .             | 445   |
| Peanuts, kernels (bags) . . . . .    | 10    |
| Walnuts (package) . . . . .          | 1     |
| Cabbages (bag) . . . . .             | 1     |
| Carrots (bags) . . . . .             | 350   |
| Cauliflowers (bag) . . . . .         | 1     |
| Cucumbers (bags) . . . . .           | 695   |
| Marrows (package) . . . . .          | 1     |
| Onions (bags) . . . . .              | 830   |
| Peas (bags) . . . . .                | 2     |
| Potatoes (bags) . . . . .            | 8,738 |
| Potatoes, sweet (package) . . . . .  | 1     |
| Swedes (bags) . . . . .              | 16    |
| Moss (packages) . . . . .            | 4     |
| Bulbs (packages) . . . . .           | 42    |
| Plants (packages) . . . . .          | 43    |
| Roots, grass (packages) . . . . .    | 2     |
| Seeds (packages) . . . . .           | 84    |
| Trees, citrus (packages) . . . . .   | 5     |
| Wine casks (number) . . . . .        | 2,703 |
| Second-hand cases (number) . . . . . | 160   |
| <i>Fumigated—</i>                    |       |
| Wine casks (number) . . . . .        | 24    |
| Second-hand cases (number) . . . . . | 160   |
| <i>Rejected—</i>                     |       |
| Bananas (bushels) . . . . .          | 15    |
| Citrus—                              |       |
| Oranges (bushel) . . . . .           | 1     |
| Potatoes (bags) . . . . .            | 146   |
| Potatoes, sweet (package) . . . . .  | 1     |

#### *Overseas.*

#### (State Law.)

|                               |     |
|-------------------------------|-----|
| Wine casks (number) . . . . . | 686 |
| <i>Fumigated—</i>             |     |
| Wine casks (number) . . . . . | 10  |

#### *Federal Quarantine Act.*

|                    | Packages. | Lbs.               |
|--------------------|-----------|--------------------|
| Seeds, &c. . . . . | 1,109     | 178,488            |
| Plants . . . . .   | 1         | No. 30             |
| Timber . . . . .   | 94,193    | Sup. ft. 3,305,699 |

### EXPORTS.

#### *Federal Commerce Act.*

|                                          |     |
|------------------------------------------|-----|
| New Zealand—Oranges (packages) . . . . . | 585 |
|------------------------------------------|-----|



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of October, 1930, also the average precipitation to the end of October, and the average annual rainfall.

| Station.                   | For Oct., 1930. | To end Oct., 1930. | Av'ge to end Oct. | Av'ge Annual Rain-fall. | Station.              | For Oct., 1930. | To end Oct., 1930. | Av'ge to end Oct. | Av'ge Annual Rain-fall. |
|----------------------------|-----------------|--------------------|-------------------|-------------------------|-----------------------|-----------------|--------------------|-------------------|-------------------------|
| FAR NORTH AND UPPER NORTH. |                 |                    |                   |                         | LOWER NORTH—continued |                 |                    |                   |                         |
| Oodnadatta .....           | 2.33            | 3.93               | 3.90              | 4.78                    | Brinkworth ....       | 2.70            | 11.46              | 14.03             | 16.01                   |
| Marree .....               | 1.83            | 5.54               | 4.70              | 5.92                    | Blyth .....           | 2.64            | 11.23              | 14.96             | 16.94                   |
| Farina .....               | 1.35            | 5.53               | 5.40              | 6.53                    | Claro .....           | 3.56            | 18.51              | 22.15             | 24.67                   |
| Copley .....               | 1.42            | 6.55               | 6.63              | 8.04                    | Mintaro .....         | 3.38            | 18.16              | 21.10             | 23.51                   |
| Beltana .....              | 1.29            | 5.86               | 7.16              | 8.68                    | Watervale .....       | 3.59            | 15.98              | 24.39             | 27.24                   |
| Blinman .....              | 1.42            | 7.16               | 10.29             | 12.12                   | Auburn .....          | 3.73            | 17.24              | 21.62             | 24.12                   |
| Hookina .....              | 1.49            | 7.69               | 9.56              | 11.85                   | Hoyleton .....        | 3.12            | 9.97               | 15.48             | 17.56                   |
| Hawker .....               | 1.90            | 8.28               | 10.52             | 12.43                   | Balaklava .....       | 3.44            | 10.64              | 13.82             | 15.99                   |
| Wilson .....               | 1.48            | 7.30               | 10.13             | 12.01                   | Port Wakefield ..     | 2.51            | 8.14               | 11.69             | 13.08                   |
| Gordon .....               | 1.25            | 7.47               | 9.05              | 10.89                   | Terowie .....         | 1.84            | 7.39               | 11.51             | 13.58                   |
| Quorn .....                | 1.48            | 7.62               | 11.77             | 13.60                   | Yarcowie .....        | 1.84            | 7.45               | 11.94             | 13.83                   |
| Port Augusta .....         | 1.54            | 5.92               | 8.15              | 9.50                    | Hallett .....         | 2.79            | 11.57              | 14.42             | 16.55                   |
| Bruce .....                | 1.27            | 7.06               | 8.33              | 10.10                   | Mount Bryan ..        | 2.98            | 12.52              | 14.78             | 16.87                   |
| Hammond .....              | 1.67            | 6.95               | 9.78              | 11.54                   | Koorunga .....        | 3.58            | 12.92              | 16.02             | 18.00                   |
| Wilmington .....           | 1.82            | 9.26               | 15.72             | 17.78                   | Farrell's Flat ..     | 3.33            | 12.60              | 16.78             | 18.82                   |
| Willowie .....             | 1.77            | 11.97              | 10.47             | 12.27                   | WEST OF MURRAY RANGE. |                 |                    |                   |                         |
| Melrose .....              | 2.06            | 12.42              | 20.76             | 23.15                   | Manoora .....         | 2.86            | 13.62              | 16.81             | 18.97                   |
| Booleroo Centre ..         | 1.89            | 10.52              | 13.41             | 15.41                   | Saddleworth .....     | 3.49            | 15.36              | 17.42             | 19.65                   |
| Port Germein .....         | 2.62            | 9.52               | 10.83             | 12.56                   | Marrabel .....        | 3.54            | 16.25              | 17.75             | 19.92                   |
| Wirrabara .....            | 2.59            | 12.09              | 17.23             | 19.47                   | Riverton .....        | 3.46            | 14.96              | 18.63             | 20.86                   |
| Appila .....               | 2.42            | 9.39               | 12.83             | 15.01                   | Tarlee .....          | 3.39            | 14.16              | 16.04             | 18.16                   |
| Craddock .....             | 1.40            | 7.97               | 9.31              | 11.00                   | Stockport .....       | 3.41            | 14.50              | 14.83             | 16.88                   |
| Carrieton .....            | 1.42            | 8.92               | 10.56             | 12.47                   | Hamley Bridge ..      | 3.02            | 12.53              | 14.68             | 16.67                   |
| Johnburg .....             | 1.47            | 8.58               | 8.89              | 10.69                   | Kapunda .....         | 3.68            | 15.23              | 17.67             | 19.92                   |
| Eurelia .....              | 1.06            | 7.31               | 11.10             | 13.14                   | Freeling .....        | 2.95            | 13.29              | 15.90             | 18.03                   |
| Orroroo .....              | 1.70            | 8.65               | 11.48             | 13.36                   | Greenock .....        | 3.55            | 16.36              | 19.26             | 21.76                   |
| Nackara .....              | 1.64            | 9.01               | 9.52              | 11.71                   | Truro .....           | 3.74            | 15.01              | 17.97             | 20.21                   |
| Black Rock .....           | 1.69            | 8.01               | 10.70             | 12.57                   | Stockwell .....       | 3.72            | 16.59              | 17.89             | 20.30                   |
| Oodlawirra .....           | 1.71            | 9.06               | —                 | *                       | Nuriootpa .....       | 3.75            | 16.89              | 18.35             | 20.74                   |
| Peterborough .....         | 1.61            | 7.60               | 11.32             | 13.40                   | Angaston .....        | 3.78            | 17.58              | 20.04             | 22.58                   |
| Yongala .....              | 2.25            | 9.50               | 12.40             | 14.57                   | Tanunda .....         | 3.19            | 16.17              | 19.86             | 22.20                   |
| NORTH-EAST.                |                 |                    |                   |                         | Lyndoch .....         | 3.05            | 17.99              | 21.24             | 23.71                   |
| Yunta .....                | 1.13            | 5.10               | 7.07              | 8.53                    | Williamstown .....    | 3.17            | 21.30              | 25.16             | 27.84                   |
| Waukaringa .....           | 0.81            | 4.53               | 6.78              | 8.38                    | ADELAIDE PLAINS.      |                 |                    |                   |                         |
| Mannahill .....            | 1.35            | 6.62               | 6.85              | 8.39                    | Owen .....            | 3.30            | 13.18              | —                 | *14.22                  |
| Cockburn .....             | 0.73            | 4.15               | 6.66              | 8.04                    | Mallala .....         | 2.69            | 11.56              | 14.85             | 16.77                   |
| Broken Hill, N.S.W.        | 1.05            | 6.23               | 8.12              | 9.71                    | Roseworthy .....      | 3.42            | 13.77              | 15.47             | 17.46                   |
| LOWER NORTH.               |                 |                    |                   |                         | Gawler .....          | 2.61            | 13.22              | 17.09             | 19.14                   |
| Port Pirie .....           | 2.32            | 8.21               | 11.69             | 13.38                   | Two Wells .....       | 2.49            | 11.13              | 14.12             | 15.88                   |
| Port Broughton ..          | 2.21            | 9.56               | 12.61             | 14.08                   | Virginia .....        | 2.37            | 11.93              | 15.34             | 17.30                   |
| Bute .....                 | 2.75            | 10.46              | 13.98             | 15.56                   | Smithfield .....      | 2.33            | 13.08              | 15.43             | 17.58                   |
| Laura .....                | 2.60            | 10.70              | 16.15             | 18.20                   | Salisbury .....       | 2.27            | 13.91              | 16.67             | 18.63                   |
| Caltowie .....             | 2.47            | 10.46              | 14.85             | 16.94                   | Adelaide .....        | 2.80            | 16.82              | 18.96             | 21.16                   |
| Jamestown .....            | 2.25            | 11.34              | 15.68             | 17.95                   | Glen Osmond .....     | 3.59            | 20.27              | 23.59             | 26.19                   |
| Gladstone .....            | 3.17            | 11.07              | 14.47             | 16.44                   | Magill .....          | 2.27            | 18.77              | 23.00             | 25.77                   |
| Crystal Brook .....        | 3.05            | 11.02              | 14.04             | 15.89                   | MOUNT LOFTY RANGES.   |                 |                    |                   |                         |
| Georgetown .....           | 3.65            | 12.81              | 16.42             | 18.53                   | Teatree Gully .....   | 2.35            | 17.78              | 24.68             | 27.70                   |
| Narridy .....              | 3.42            | 12.26              | 14.25             | 15.99                   | Stirling West ..      | 4.68            | 36.18              | 42.83             | 47.04                   |
| Redhill .....              | 3.27            | 12.36              | 14.90             | 17.02                   | Uraidla .....         | 3.99            | 30.61              | 40.28             | 44.38                   |
| Spalding .....             | 3.72            | 11.71              | 16.96             | 19.53                   | Clarendon .....       | 2.47            | 23.29              | 29.96             | 33.03                   |
| Gulnare .....              | 4.02            | 13.41              | 16.53             | 18.92                   | Morphett Vale ..      | 2.01            | 16.75              | 20.46             | 22.78                   |
| Yacka .....                | 3.47            | 12.60              | 13.59             | 15.40                   | Noarlunga .....       | 2.15            | 14.80              | 18.53             | 20.49                   |
| Koolunga .....             | 3.26            | 10.88              | 13.75             | 15.61                   | Willunga .....        | 1.98            | 19.07              | 23.85             | 26.07                   |
| Snowtown .....             | 3.29            | 11.25              | 14.05             | 15.78                   | Aldinga .....         | 1.40            | 14.45              | 18.42             | 20.43                   |



## RAINFALL—continued.

| Station.                         | For Oct., 1930. | To end Oct., 1930 | Av'ge to end Oct. | Av'ge Annual Rain-fall. | Station.                             | For Oct., 1930. | To end Oct., 1930. | Av'ge to end Oct. | Av'ge Annual Rain-fall. |
|----------------------------------|-----------------|-------------------|-------------------|-------------------------|--------------------------------------|-----------------|--------------------|-------------------|-------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                 |                   |                   |                         | <b>WEST OF SPENCER'S GULF—contd.</b> |                 |                    |                   |                         |
| Myponga .....                    | 2.44            | 23.84             | 26.41             | 29.62                   | Rudall .....                         | 3.00            | 12.12              | 10.70             | *12.14                  |
| Normanville .....                | 1.70            | 16.05             | 18.92             | 20.75                   | Cleve .....                          | 4.07            | 13.89              | 13.04             | 14.63                   |
| Yankalilla .....                 | 2.24            | 16.41             | 20.98             | 23.61                   | Cowell .....                         | 2.25            | 8.27               | 9.98              | 11.25                   |
| Mount Pleasant ..                | 3.37            | 21.14             | 24.87             | 27.38                   | Miltalie .....                       | 2.90            | 10.71              | 12.12             | 13.89                   |
| Birdwood .....                   | 2.95            | 21.95             | 26.59             | 29.41                   | Darke's Peak ..                      | 3.15            | 11.42              | 13.35             | 15.13                   |
| Gumeracha .....                  | 3.23            | 25.60             | 30.37             | 33.54                   | Kimba .....                          | 2.98            | 11.15              | 10.02             | *11.92                  |
| Millbrook Reservoir              | 2.59            | 24.58             | 31.92             | 36.18                   |                                      |                 |                    |                   |                         |
| Tweedvale .....                  | 3.02            | 28.17             | 32.90             | 36.08                   |                                      |                 |                    |                   |                         |
| Woodside .....                   | 2.81            | 23.42             | 29.51             | 32.47                   |                                      |                 |                    |                   |                         |
| Ambleside .....                  | 3.37            | 26.44             | 31.97             | 35.09                   |                                      |                 |                    |                   |                         |
| Nairne .....                     | 3.66            | 22.62             | 25.58             | 28.29                   |                                      |                 |                    |                   |                         |
| Mount Barker ....                | 4.15            | 29.90             | 28.85             | 31.66                   |                                      |                 |                    |                   |                         |
| Echunga .....                    | 2.82            | 23.48             | 30.38             | 33.35                   |                                      |                 |                    |                   |                         |
| Macclesfield .....               | 2.86            | 21.14             | 27.69             | 30.72                   |                                      |                 |                    |                   |                         |
| Meadows .....                    | 2.92            | 24.24             | 32.99             | 36.42                   |                                      |                 |                    |                   |                         |
| Strathalbyn .....                | 2.51            | 13.71             | 17.45             | 19.43                   |                                      |                 |                    |                   |                         |
| <b>MURRAY FLATS AND VALLEY</b>   |                 |                   |                   |                         | <b>YORKE PENINSULA.</b>              |                 |                    |                   |                         |
| Meningie .....                   | 2.78            | 14.03             | 16.58             | 18.52                   | Walleroo .....                       | 2.66            | 10.09              | 12.64             | 13.99                   |
| Milang .....                     | 1.65            | 10.22             | 13.01             | 15.13                   | Kadina .....                         | 2.41            | 10.07              | 14.28             | 15.77                   |
| Langhorne's Creek                | 1.97            | 12.40             | 12.95             | 14.84                   | Moonta .....                         | 2.48            | 10.90              | 13.68             | 15.16                   |
| Wellington .....                 | 1.74            | 11.35             | 12.84             | 14.67                   | Paskeville .....                     | 2.63            | 10.01              | 14.21             | 15.67                   |
| Tailem Bend .....                | 2.90            | 12.76             | 12.71             | 14.77                   | Maitland .....                       | 2.47            | 14.31              | 18.21             | 20.03                   |
| Murray Bridge ...                | 2.41            | 9.55              | 12.05             | 13.84                   | Ardrossan .....                      | 1.99            | 10.82              | 12.67             | 14.02                   |
| Callington .....                 | 2.15            | 11.64             | 13.59             | 15.40                   | Port Victoria ..                     | 1.56            | 11.86              | 13.89             | 15.41                   |
| Mannum .....                     | 2.41            | 9.58              | 10.18             | 11.56                   | Curramulka ...                       | 2.61            | 14.11              | 16.33             | 17.98                   |
| Palmer .....                     | 3.05            | 12.88             | 13.74             | 15.59                   | Minlaton .....                       | 1.89            | 12.68              | 16.31             | 17.98                   |
| Sedan .....                      | 3.19            | 11.09             | 10.81             | 12.24                   | Pt. Vincent ....                     | 2.12            | 11.96              | 13.03             | 14.54                   |
| Swan Reach .....                 | 3.08            | 8.77              | 9.23              | 10.77                   | Brentwood .....                      | 1.45            | 11.55              | 13.99             | 15.67                   |
| Blanchetown .....                | 2.66            | 7.89              | 9.67              | 11.24                   | Stansbury .....                      | 1.90            | 11.84              | 15.41             | 16.95                   |
| Eudunda .....                    | 3.42            | 14.55             | 15.10             | 17.19                   | Warooka .....                        | 1.53            | 12.86              | 16.23             | 17.67                   |
| Sutherlands .....                | 2.61            | 9.85              | 8.66              | 10.87                   | Yorketown .....                      | 1.24            | 13.63              | 15.51             | 17.04                   |
| Morgan .....                     | 3.66            | 9.39              | 7.76              | 9.23                    | Edithburgh ....                      | 0.99            | 11.23              | 14.89             | 16.52                   |
| Waikerie .....                   | 3.83            | 10.51             | 8.18              | 9.71                    |                                      |                 |                    |                   |                         |
| Overland Corner ..               | 2.64            | 8.47              | 8.86              | 10.58                   |                                      |                 |                    |                   |                         |
| Loxton .....                     | 3.59            | 10.86             | 10.07             | 11.80                   |                                      |                 |                    |                   |                         |
| Renmark .....                    | 2.20            | 8.16              | 8.96              | 10.60                   |                                      |                 |                    |                   |                         |
| <b>WEST OF SPENCER'S GULF.</b>   |                 |                   |                   |                         | <b>SOUTH AND SOUTH-EAST.</b>         |                 |                    |                   |                         |
| Eucla .....                      | 1.72            | 13.32             | —                 | *                       | Cape Borda ....                      | 0.78            | 24.86              | 23.10             | 24.81                   |
| Nullarbor .....                  | 1.94            | —                 | —                 | —                       | Kingscote .....                      | 1.12            | 20.81              | 17.57             | 19.07                   |
| Fowler's Bay ....                | 1.75            | 7.19              | 10.91             | 11.85                   | Penneshaw ....                       | 1.14            | 12.34              | 16.55             | 18.75                   |
| Penong .....                     | 1.99            | 7.30              | 10.94             | 12.12                   | Victor Harbor ..                     | 1.99            | 16.42              | 19.45             | 21.32                   |
| Koonibba .....                   | 0.91            | 6.48              | 10.96             | *                       | Port Elliot .....                    | 1.89            | 13.32              | 17.84             | 20.05                   |
| Denial Bay .....                 | 1.32            | 6.88              | 10.65             | *11.56                  | Goolwa .....                         | 2.30            | 12.93              | 15.93             | 17.90                   |
| Ceduna .....                     | 1.10            | 6.82              | 8.80              | 9.92                    | Copeville .....                      | 2.37            | 8.43               | —                 | 11.58                   |
| Smoky Bay .....                  | 1.06            | 5.32              | 9.58              | 10.61                   | Meribah .....                        | 3.82            | 10.16              | 9.12              | *11.70                  |
| Wirrulla .....                   | 2.36            | 8.89              | —                 | *                       | Alawoona .....                       | 3.03            | 9.58               | 8.72              | *10.20                  |
| Streaky Bay .....                | 1.96            | 8.26              | 13.85             | 14.95                   | Mindarie .....                       | 2.79            | 9.78               | 10.16             | 12.46                   |
| Chandada .....                   | 1.54            | 9.76              | —                 | —                       | Sandalwood ....                      | 2.47            | 10.61              | 11.83             | 13.90                   |
| Minnipa .....                    | 2.26            | 9.91              | 12.86             | 14.68                   | Karoonda .....                       | 3.31            | 12.74              | 12.56             | 14.48                   |
| Kyanoutta .....                  | 2.36            | —                 | —                 | 13.68                   | Pinnaroo .....                       | 2.99            | 10.29              | 12.88             | 14.94                   |
| Talia .....                      | 2.27            | 9.24              | 13.50             | 15.27                   | Parilla .....                        | 3.82            | 11.24              | 12.25             | 14.15                   |
| Port Ellioton ....               | 2.15            | 9.61              | 11.27             | 16.53                   | Lameroo .....                        | 3.56            | 12.83              | 14.25             | 16.33                   |
| Yeelanna .....                   | 1.54            | 10.40             | 14.77             | 16.12                   | Parrakie .....                       | 3.38            | 12.90              | 12.73             | 14.54                   |
| Cummins .....                    | 1.06            | 11.36             | 16.33             | 17.86                   | Geranium .....                       | 3.25            | 13.75              | 14.66             | 16.54                   |
| Port Lincoln .....               | 0.85            | 13.66             | 17.89             | 19.50                   | Peake .....                          | 3.85            | 13.38              | 14.41             | 16.41                   |
| Timby .....                      | 1.10            | 9.82              | 12.40             | 14.22                   | Cooke's Plains ..                    | 2.07            | 11.54              | 13.66             | 15.46                   |
| Ungarra .....                    | 2.08            | 12.92             | 15.09             | 16.85                   | Coomandook ...                       | 2.63            | 12.90              | 15.35             | 17.45                   |
| Carrow .....                     | 1.81            | 7.59              | 11.61             | 13.47                   | Coonalpyn .....                      | 2.76            | 13.74              | 15.56             | 17.52                   |
| Arno Bay .....                   | 2.15            | 10.52             | 11.04             | 12.48                   | Tintinara .....                      | 2.18            | 13.30              | 16.55             | 18.78                   |
|                                  |                 |                   |                   |                         | Keith .....                          | 2.18            | 15.22              | 15.73             | 17.96                   |
|                                  |                 |                   |                   |                         | Bordertown ....                      | 2.68            | 15.61              | 17.07             | 19.39                   |
|                                  |                 |                   |                   |                         | Wolsley .....                        | 2.67            | 17.03              | 16.32             | 18.36                   |
|                                  |                 |                   |                   |                         | Frances .....                        | 2.37            | 18.81              | 17.59             | 19.96                   |
|                                  |                 |                   |                   |                         | Naracoorte ....                      | 2.29            | 21.14              | 20.06             | 22.57                   |
|                                  |                 |                   |                   |                         | Penola .....                         | 2.30            | 22.73              | 23.30             | 26.19                   |
|                                  |                 |                   |                   |                         | Lucindale .....                      | 3.81            | 22.26              | 20.72             | 23.07                   |
|                                  |                 |                   |                   |                         | Kingston .....                       | 2.50            | 20.96              | 22.00             | 24.40                   |
|                                  |                 |                   |                   |                         | Robe .....                           | 2.66            | 25.16              | 22.46             | 24.60                   |
|                                  |                 |                   |                   |                         | Beachport .....                      | 2.07            | 25.38              | 24.73             | 26.95                   |
|                                  |                 |                   |                   |                         | Millicent .....                      | 2.84            | 26.72              | 27.10             | 29.70                   |
|                                  |                 |                   |                   |                         | Kalangadoo ....                      | 2.54            | 27.69              | 28.99             | 32.30                   |
|                                  |                 |                   |                   |                         | Mount Gambler ..                     | 2.28            | 20.18              | 27.34             | 30.82                   |

Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

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|-------------------------|-----------------|--------------------|------|---------------------------------|-----------------|--------------------|------|
|                         |                 | Nov.               | Dec. |                                 |                 | Nov.               | Dec. |
| Alawoona .....          | 436             | —                  | —    | Budunda .....                   | 428             | 3                  | 1    |
| Aldinga .....           | •               | —                  | —    | Eurelia .....                   | 416             | 8                  | 13   |
| Allandale East .....    | 415             | 3 & 31             | 5    | Eurelia Women's .....           | 417             | 5                  | 3    |
| Alma .....              | 423             | —                  | —    | Everard East .....              | †               | —                  | —    |
| Amyton .....            | •               | —                  | —    | Farrell's Flat .....            | †               | 28                 | 26   |
| Angaston .....          | •               | —                  | —    | Finniss .....                   | •               | —                  | —    |
| Appila .....            | •               | —                  | —    | Gawler River .....              | •               | —                  | —    |
| Appila-Yarrowlie .....  | 416             | 7                  | —    | Georgetown .....                | •               | 1                  | 6    |
| Arthurton .....         | •               | —                  | —    | Geranium .....                  | •               | 29                 | 27   |
| Ashbourne .....         | †               | 5                  | 3    | Gladstone .....                 | †               | —                  | 5    |
| Auburn .....            | •               | —                  | —    | Gladstone Women's .....         | •               | 14                 | 12   |
| Auburn Women's .....    | •               | —                  | —    | Glencoe .....                   | •               | 11                 | 9    |
| Balaklava .....         | 423             | R                  | R    | Glossop .....                   | •               | —                  | —    |
| Balhannah .....         | •               | —                  | —    | Goode .....                     | •               | 6                  | 4    |
| Barmra .....            | •               | —                  | —    | Goode Women's .....             | 433             | —                  | —    |
| Beetaloo Valley .....   | 413             | 6                  | R    | Greenock .....                  | †               | 10                 | 8    |
| Belalie North .....     | •               | R                  | R    | Green Patch .....               | 433             | 6                  | —    |
| Belalie Women's .....   | 413             | —                  | —    | Gulnare .....                   | •               | —                  | —    |
| Berri .....             | •               | 5                  | 3    | Gumeracha .....                 | •               | 3                  | 8    |
| Big Swamp .....         | •               | —                  | —    | Halldon .....                   | •               | —                  | —    |
| Blackheath .....        | †               | 6                  | 11   | Hanson .....                    | •               | —                  | —    |
| Black Rock .....        | •               | 4                  | R    | Hartley .....                   | †               | 19                 | 31   |
| Black Springs .....     | †               | 4                  | 2    | Hawker .....                    | •               | 4                  | 9    |
| Blackwood .....         | 440             | 10                 | 8    | Hookina .....                   | •               | —                  | —    |
| Block M .....           | 436             | —                  | —    | Hoyleton .....                  | 428             | R                  | R    |
| Blyth .....             | †               | 21                 | 19   | Inman Valley .....              | 440             | 20                 | 18   |
| Booloroo Centre .....   | 419             | —                  | 5    | Ironbank .....                  | 440             | —                  | —    |
| Booolgun .....          | †               | 6                  | 4    | Jamestown .....                 | •               | R                  | R    |
| Boora Plains .....      | 429             | 6                  | 4    | Kalangadoo Women's .....        | 415             | 8                  | 13   |
| Borrkna .....           | •               | —                  | —    | Kalangadoo .....                | •               | 11                 | 9    |
| Bowhill .....           | 436             | 17                 | 1    | Kalyan .....                    | 436             | 19                 | 17   |
| Brentwood .....         | •               | 6                  | 4    | Kangarilla .....                | 440             | —                  | —    |
| Brinkley .....          | 436             | 5                  | 3    | Kangarilla Women's .....        | •               | 20                 | 18   |
| Brinkworth .....        | †               | 3                  | 1    | Kanmantoo .....                 | •               | —                  | —    |
| Brownlow .....          | 428             | —                  | —    | Kanni .....                     | 436             | —                  | —    |
| Buchanan .....          | 428             | —                  | —    | Kapinnie .....                  | 436             | —                  | —    |
| Bugle .....             | 436             | 11                 | 9    | Kapunda .....                   | •               | 14                 | 12   |
| Bundaleer Springs ..... | •               | —                  | —    | Karoontaby .....                | •               | —                  | —    |
| Bunora .....            | •               | 6                  | 6    | Karoonda .....                  | •               | 5                  | 3    |
| Bute .....              | •               | 20                 | 18   | Keith .....                     | 415             | 6                  | 4    |
| Butler .....            | •               | —                  | —    | Kelly .....                     | 433             | 1                  | 6    |
| Calra .....             | •               | —                  | —    | Ki Ki .....                     | 436             | —                  | —    |
| Cadell .....            | •               | —                  | —    | Kilkerran .....                 | 430             | 6                  | 4    |
| Caliph .....            | 436             | 4                  | 2    | Kongorong .....                 | 415             | 3                  | 1    |
| Caltowie .....          | 419             | —                  | —    | Koolunga .....                  | 421             | 11                 | —    |
| Canowie Belt .....      | •               | —                  | —    | Koonibba .....                  | •               | 6                  | 4    |
| Caraius .....           | †               | 5                  | 3    | Koonunga .....                  | 421             | 4                  | 2    |
| Carrow .....            | •               | 5                  | 3    | Kopplo .....                    | 433             | 3                  | 1    |
| Chandada .....          | 431             | 21                 | 19   | Kringin .....                   | •               | 3                  | 8    |
| Charra .....            | •               | —                  | —    | Kulkawirra .....                | †               | R                  | R    |
| Cherry Gardens .....    | †               | —                  | —    | Kyancutta .....                 | •               | 4                  | 2    |
| Clanfield .....         | 436             | —                  | —    | Kybybolite .....                | •               | 6                  | 2    |
| Clare .....             | •               | 4                  | 2    | Lameroo .....                   | †               | 1                  | 6    |
| Clarendon .....         | •               | 3                  | 1    | Langhorne's Creek .....         | 442             | 5                  | 3    |
| Cleve .....             | •               | 6                  | 4    | Laura .....                     | •               | 8                  | 6    |
| Cobdogla .....          | •               | —                  | —    | Laura Bay .....                 | 433             | 11                 | 9    |
| Codlie .....            | •               | 5                  | 3    | Lenawood and Forest Range ..... | 442             | —                  | —    |
| Colton .....            | •               | —                  | —    | Light's Pass .....              | †               | 3                  | 1    |
| Coomandook .....        | 436             | 28                 | 26   | Lipsen .....                    | 433             | 1                  | 6    |
| Coonalpya .....         | •               | —                  | —    | Lone Gum and Monash .....       | •               | 5                  | 3    |
| Coonawarra .....        | •               | 6                  | 4    | Lone Pine .....                 | •               | —                  | —    |
| Coorable .....          | •               | —                  | —    | Longwood .....                  | 442             | —                  | —    |
| Copeville .....         | 436             | —                  | —    | Lowbank .....                   | •               | 5                  | R    |
| Coolha .....            | •               | —                  | —    | Loxton .....                    | †               | 14                 | 12   |
| Cradook .....           | •               | —                  | —    | Lucindale .....                 | •               | —                  | —    |
| Cungena .....           | 432             | —                  | —    | Lyndoch .....                   | 425             | 4                  | 2    |
| Currency Creek .....    | 440             | 3                  | 8    | McLaren Flat .....              | 442             | 6                  | —    |
| Cygnet River .....      | •               | —                  | —    | MacGillivray .....              | •               | 4                  | 2    |
| Darke's Peak .....      | •               | —                  | —    | Mallala .....                   | •               | 17                 | 15   |
| Dudley .....            | •               | —                  | —    | Maltee .....                    | †               | 4                  | 4    |
| Edlille .....           | •               | —                  | —    | Mangalo .....                   | †               | —                  | —    |
| Elbow Hill .....        | 432             | 11                 | 9    | Mannasarie .....                | •               | —                  | —    |



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| Marama .....               | 487             | —                  | —    | Roberts and Verran .....     | †               | 5                  | R    |
| Meadows .....              | *               | 5                  | 8    | Rockwood .....               | †               | 8                  | 1    |
| Meribah .....              | 487             | 10                 | 8    | Rosedale .....               | 428             | —                  | —    |
| Milang .....               | 442             | 8                  | R    | Roseworthy .....             | †               | —                  | —    |
| Milendilla .....           | 487             | R                  | R    | Rosy Pine .....              | *               | —                  | —    |
| Millicent .....            | *               | 28                 | 26   | Rudall .....                 | *               | 4                  | 2    |
| Millicent Women's .....    | 415             | —                  | —    | Saddleworth .....            | 428             | 7                  | R    |
| Miltalle .....             | 433             | 1                  | R    | Saddleworth Women's .....    | †               | 4                  | 2    |
| Mindarie .....             | *               | 7                  | 5    | Sallsbury .....              | †               | 11                 | 9    |
| Minnipa .....              | 433             | —                  | —    | Salt Creek .....             | *               | —                  | —    |
| Modbury .....              | *               | —                  | —    | Sandalwood .....             | *               | —                  | —    |
| Monarto South .....        | 437             | —                  | —    | Scott's Bottom .....         | †               | 1                  | 6    |
| Moonta .....               | *               | —                  | —    | Shoal Bay .....              | 443             | 4                  | 2    |
| Moorlands .....            | *               | 5                  | 3    | Smoky Bay .....              | 435             | 1                  | 6    |
| Moorook .....              | 438             | —                  | —    | Snowtown .....               | 422             | 14                 | 12   |
| Morchar .....              | †               | —                  | 5    | South Kilkerran .....        | †               | 4                  | 2    |
| Morphett Vale .....        | †               | —                  | —    | Spalding .....               | †               | —                  | —    |
| Mount Barker .....         | 442             | 5                  | 3    | Springton .....              | †               | 5                  | 3    |
| Mount Bryan .....          | 421             | —                  | —    | Stirling .....               | †               | —                  | —    |
| Mount Compass .....        | 443             | 6                  | 4    | Stockport .....              | *               | —                  | —    |
| Mount Gambier .....        | 415             | 14                 | 12   | Strathalbyn .....            | *               | —                  | —    |
| Mount Hope .....           | †               | 4                  | 2    | Streaky Bay .....            | *               | 28                 | 26   |
| Mount Pleasant .....       | *               | —                  | —    | Tallem Bend .....            | *               | 18                 | 11   |
| Mount Remarkable .....     | *               | —                  | —    | Talla .....                  | 435             | 28                 | R    |
| Mount Schank .....         | *               | —                  | —    | Tantanoola .....             | 416             | 1                  | 6    |
| Mudamuckla .....           | *               | 8                  | 18   | Taplan .....                 | †               | 4                  | 2    |
| Mundalla .....             | 415             | 6                  | 4    | Taragora .....               | †               | 6                  | —    |
| Murray Bridge .....        | *               | 19                 | —    | Tarcowie .....               | *               | —                  | —    |
| Murraytown .....           | 422             | 1                  | —    | Tarlee .....                 | *               | —                  | —    |
| Myponga .....              | †               | 26                 | —    | Tatlar .....                 | *               | —                  | —    |
| Myrla .....                | †               | 5                  | 3    | Thrington .....              | 430             | —                  | —    |
| Nantawarra .....           | †               | 6                  | 4    | Tintinara .....              | 416             | 29                 | —    |
| Naracorte .....            | *               | 8                  | 13   | Truro .....                  | †               | 10                 | R    |
| Narridy .....              | 422             | 6                  | R    | Tulkinara .....              | †               | 6                  | 4    |
| Narrung .....              | 448             | —                  | —    | Tweedvale .....              | †               | 6                  | 4    |
| Nelshaby .....             | †               | —                  | —    | Two Wells .....              | 429             | —                  | —    |
| Nelshaby Women's .....     | 422             | R                  | R    | Ungarra .....                | †               | 13                 | 11   |
| Netherton .....            | 438             | 19                 | R    | Upper Wakefield .....        | *               | 6                  | —    |
| New Residence .....        | *               | —                  | —    | Uraidla and Summertown ..... | †               | 3                  | R    |
| North Booborowie .....     | 422             | 3                  | 1    | Velich .....                 | †               | —                  | —    |
| Nunilkompita .....         | 434             | 6                  | 4    | Virginia .....               | *               | —                  | —    |
| Nunkeri .....              | 438             | 5                  | 8    | Walkerie .....               | *               | 14                 | 12   |
| O'Loughlin .....           | *               | 10                 | 8    | Wallala .....                | 435             | 12                 | 10   |
| Orroroo .....              | *               | —                  | —    | Wanbi .....                  | *               | 26                 | 24   |
| Overland Corner .....      | 438             | 4                  | R    | Wandearah .....              | 422             | 11                 | R    |
| Owen .....                 | 428             | —                  | 5    | Warcowie .....               | 418             | R                  | R    |
| Palahie .....              | 434             | —                  | —    | Warramboo .....              | *               | 4                  | 2    |
| Parilla .....              | *               | —                  | —    | Wasleys .....                | 429             | 13                 | 11   |
| Parilla Women's .....      | 438             | 19                 | 17   | Wasleys Women's .....        | †               | 6                  | 4    |
| Parilla Well .....         | *               | 3                  | 8    | Watervale .....              | †               | —                  | —    |
| Parilla Well Women's ..... | †               | R                  | R    | Wauratie .....               | *               | 4                  | 2    |
| Parrakie .....             | 440             | —                  | —    | Weavers .....                | †               | 10                 | 8    |
| Parua .....                | 439             | 7                  | 5    | Wepowie .....                | 418             | 8                  | 1    |
| Paskeville .....           | †               | 4                  | —    | White's River .....          | *               | —                  | 14   |
| Pata .....                 | †               | 7                  | 5    | Whyte-Yarcowie .....         | *               | —                  | —    |
| Penneshaw .....            | †               | —                  | —    | Willkawatt Women's .....     | *               | 18                 | 16   |
| Penola .....               | 416             | 1                  | 6    | Williamstown Women's .....   | †               | 5                  | 3    |
| Penwortham .....           | †               | 6                  | 4    | Williamstown .....           | *               | —                  | —    |
| Petersville .....          | †               | 4                  | 2    | Willowie .....               | †               | —                  | R    |
| Petina .....               | 434             | 22                 | 27   | Wilmington .....             | 418             | 18                 | 16   |
| Piabong .....              | 434             | 1                  | 6    | Windsor .....                | 429             | —                  | —    |
| Pinkawilline .....         | 435             | —                  | —    | Wirrabara .....              | 422             | —                  | —    |
| Pinnaroo .....             | *               | —                  | —    | Wirrilla .....               | *               | 6                  | R    |
| Pinnaroo Women's .....     | †               | 7                  | 5    | Wirrulla .....               | 435             | 22                 | R    |
| Poochera .....             | 435             | —                  | —    | Wolsley .....                | 416             | 10                 | 15   |
| Port Elliot .....          | 443             | 8                  | R    | Wudinna .....                | †               | —                  | —    |
| Pygery .....               | †               | 1                  | —    | Wynarka .....                | †               | —                  | —    |
| Quorn .....                | †               | 5                  | —    | Yacka .....                  | †               | —                  | —    |
| Ramco .....                | †               | 3                  | 1    | Yadnarie .....               | †               | 4                  | 2    |
| Rapid Bay .....            | 443             | 18                 | 11   | Yallunda Flat .....          | †               | —                  | —    |
| Redhill .....              | †               | —                  | —    | Yandiah .....                | 422             | R                  | R    |
| Rendelsham .....           | 416             | 4                  | 2    | Yanine .....                 | *               | —                  | —    |
| Renmark .....              | 440             | —                  | —    | Yantanable .....             | †               | —                  | —    |
| Rhyrie .....               | *               | —                  | —    | Yeeelanna .....              | †               | 5                  | 8    |
| Robman's Creek .....       | *               | 6                  | 4    | Yorktown-Melville .....      | *               | —                  | —    |
| Riverton .....             | †               | R                  | R    | Youngusband .....            | †               | —                  | —    |
| Riverton Women's .....     | †               | —                  | —    | Yurgo .....                  | †               | —                  | —    |

\* No report received during the month of October.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

##### ALLANDALE EAST.

Meeting held July 4th. Present: 15 members. The meeting was devoted to discussing arrangements for holding hay, crop, and improved pasture competitions. (Secretary, Mr. T. Earl.)

##### ALLANDALE EAST.

Meeting held August 8th. Present: 19 members. Mr. C. Winterfield contributed an interesting paper, "Early Days in the Rendelsham District." Matters in connection with local competitions were also discussed. (Secretary, Mr. T. Earl.)

##### KALANGADOO WOMEN'S (Average annual rainfall, 32.30in.).

Meeting held August 2nd. Present: Eight members. Mrs. Messenger read an instructive paper, "Floor Polishing." A good discussion followed. (Secretary, Mrs. Kennedy.)

##### KEITH (Average annual rainfall, 17.96in.).

July 24th.—Present: Eight members.

**TOMATO CULTURE.**—In the course of a paper dealing with the subject, "Tomato Growing without Artificial Watering," Mr. A. Densley said he had selected an eastern slope of sandy soil on which to grow tomatoes. The seeds were planted thinly in a large, flat box, and when the seedlings had developed three leaves they were transplanted with a piece of soil adhering to them. It was advisable to choose a dull day for transplanting and space the plants 3ft. apart. No manure was used, but all the wood ashes from the house were saved and hoed into the ground from the time of planting until the tomatoes were ready to pick. He advised picking the tomatoes directly they showed signs of coloring, when they could be put into the shed to ripen off. An important point was to keep the ground stirred, particularly after any showers of rain fell. (Secretary, Mr. C. Densley.)

##### KONGORONG.

Meeting held August 11th. Present: 12 members. Mr. E. S. Alcock (District Agricultural Instructor) delivered an address, "Sheep Diseases." The annual report was presented, and officers elected. It was decided to record in the minutes the valuable work performed by Mr. T. Morrison, who had acted in the capacity of Secretary of the Branch for 10 years. (Secretary, Mr. S. Johnston.)

##### MILLICENT WOMEN'S (Average annual rainfall, 29.70in.).

The monthly meeting was held on August 8th, there being present 11 members. The following papers were read and were responsible for instructive discussions:—"Hints on Invalid Cooking," Mrs. H. Altschwager; "The Planning of Meals," Mrs. G. Millhouse; "Cooking Fish," Mrs. L. Oberlander; "Preserving Fruit" and "Home Nursing," Mrs. Varcoe. (Secretary, Mrs. W. Varcoe.)

##### MOUNT GAMBIER (Average annual rainfall, 30.82in.).

Fifteen members and visitors attended the annual meeting, which was held on July 11th. The annual report and balance-sheet were submitted by the Secretary, Mr. G. T. Gurry, and officers elected for the ensuing year.

##### MUNDALLA (Average annual rainfall, 19.39in.).

The Annual Meeting was held on August 8th. Mr. R. Dinning occupied the chair. Addresses were delivered by Messrs. H. C. Pritchard and E. S. Alcock, of the Department of Agriculture. Twelve members were present. (Secretary, Mr. A. Ross.)



**PENOLA** (Average annual rainfall, 26.19in.).

Meeting held August 1st. Present: Seven members. A paper, "Standardisation of Primary Production," was contributed by Mr. Richardson.

The Annual Meeting was held on July 4th, there being present Mr. H. Richardson (Chair) and 10 members. The annual report was read and officers elected. (Secretary, Mr. F. Hinze.)

**RENDELSHAM.**

Meeting held August 9th. Present: 10 members and visitors. The Secretary, Mr. F. White, read an interesting paper, "The Waite Research Institute," which aroused a keen discussion.

**TANTANOOLA.**

Meeting held August 2nd. Present: Mr. R. Searle (chair) and eight members. The Hon. Secretary, Mr. H. Kennedy, read an article, "Flax Growing," which aroused an instructive discussion.

**TINTINARA** (Average annual rainfall, 18.78in.).

The meeting of July 26th was held at Messrs. Lewis Bros., Calgara Station, there being present 15 members and 19 visitors. The meeting was devoted to an inspection of the property

The meeting held on August 2nd was attended by six members and seven visitors, when Mr. H. H. Orchard (District Horticultural Instructor) gave a pruning demonstration. (Secretary, Mr. B. Fotheringham.)

**WOLSELEY** (Average annual rainfall, 18.36in.).

In the presence of 37 members and about 150 visitors, including members of the Tatiara Branch, Messrs. L. Cook, E. Alcock, H. Orchard, and W. Downes, of the Department of Agriculture, prizes were presented to the successful competitors in competitions conducted under the auspices of the Branch at a social gathering held on July 10th. Later in the month a meeting was addressed by Mr. H. Adams (Agricultural Instructor on Eyre Peninsula). (Secretary, Mr. E. Sharrad.)

**WOLSELEY** (Average annual rainfall, 18.36in.).

Mr. H. Pilgrim occupied the chair at the meeting held on August 11th, there being present 19 members. A paper, "The Value of Competitions to the Farmer," was contributed by Mr. Pilgrim. Mr. A. Grosser gave information concerning the wheat variety experiment plots being conducted on his farm. (Secretary, Mr. E. Sharrad.)

**UPPER-NORTH DISTRICT.****(PETERBOROUGH AND NORTHWARD.)****APPILA YARROWIE** (Average annual rainfall, 15.01in.).

Meeting held July 28th. Present: 15 members. Mr. E. L. Griffiths (District Agricultural Instructor for the Mallee Lands) addressed the meeting. (Secretary, Mr. E. Wurst, Appila.)

**EURELIA** (Average annual rainfall, 13.14in.).

August 6th.—Present: Eight members.

**FENCING.**—Mr. T. Brown, in reading a paper on this subject, said to make the holding vermin and sheep proof the boundary fence should be wire-netted. For posts, he recommended pine or red gum cut 5ft. 4in. long and placed 18in. in the ground. The posts should be spaced 15ft. apart, and the fence consist of two plain wires and a barb. The bottom wire should be 18in. from the ground, the next 40in., and the barb on top of the posts. Forty-two inch wire netting should be used and placed 3 in. in the ground. The netting should be tied six times between each post. Strains should be 25 posts apart. Another good fence for the boundary consisted of posts 45ft. apart with two flat iron posts, four plain, and two barb wires, the wires to be spaced as follows:—The bottom, 7½in. from the ground, the next 19in. from the ground, the next 26½in. from the ground, the next a barb 35in. from the ground, and the top wire a barb on top of the post. The barb wire should be tied to every post. A good subdivision fence consisted of posts 4ft. 9in. long placed 18in. in the ground. If plenty of timber was available the posts could be placed 15ft. apart with a strain every 25 posts. Failing plenty of timber a wooden post could be placed every 45ft. with two iron droppers between. Four plain and two barb wires should be used, the wires to be spaced as



follows from the ground:—The bottom wire 7½in., 14in., 20½in., 28½in., and the barb on top of the post. The speaker advised using the posts as soon after cutting as possible. If pine posts were allowed to dry they were inclined to split, which allowed water to enter and they soon rotted. (Secretary, Mr. E. Wall.)

**EURELIA WOMEN'S** (Average annual rainfall, 13.14in.).

August 6th.—Present: Eight members.

**CAKE AND SWEETS RECIPES.**—The following recipes were handed in:—*Sultana Cake.*—Beat ½lb. of butter to a cream and add ½lb. of sugar. Beat again and add 2 eggs, and beat for a few minutes and continue until 6 eggs have been used. Mix 1lb. of sultanas with ½lb. flour and a little essence of lemon. Stir gently into the mixture and bake for 1½ hours in a moderately hot oven. *Cream Puffs.*—½lb. butter, 1 cup of water, place in a saucepan or basin, put on the fire, bring to the boil, and then mix in 1 cupful of flour. The mixture should be fairly thick. Put aside to cool, then beat in 4 eggs, one at a time, and drop on to a cold tray one fair-sized teaspoonful of the mixture. The oven should be fairly brisk, and the mixture allowed to bake slowly. The puffs take just about 1 hour to cook. *Hard Times Cake.*—Ingredients: 3lbs. flour, ½lb. currants or sultanas, ½lb. dripping, ½lb. sugar, 1 pint yeast, and 1½ pints milk. Method—Sift flour and add currants. Put milk, dripping, and sugar on to heat, and stir until the sugar and dripping are melted. Add yeast to flour, then pour on milk and mixture and mix all well together to make a stiff dough. Set aside ready to

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rise. *Yeast*—Save the water in which potatoes have been boiled, and whilst still warm add  $\frac{1}{2}$  teaspoonful of tartaric acid, 3 teaspoonfuls of sugar, and  $\frac{1}{2}$  teaspoonful of salt. Bottle until it rises. It is advisable to use a bottle which has previously contained yeast or a small quantity of baker's yeast. *Cocoa-nut Tea Cakes*—Ingredients: 2 cupfuls flour, 1 small cup of sugar, 1 cup of milk,  $\frac{1}{2}$  cup of butter, 3 eggs, essence, teaspoonful of baking powder, and 1 cup of cocoanut. Method: Cream butter and sugar, add well-beaten eggs, a little at a time, beat well, and add flour with baking powder and cocoanut mixed. Add milk, and bake in small patty-pans until a nice brown color. This takes about 10 minutes. This mixture is sufficient for about 4 doz. cakes. *Golden Crust Sponge*—2 eggs,  $1\frac{1}{2}$  cupfuls of S.R. flour, 3 teaspoonfuls of butter, and 8 teaspoonfuls of boiling water, essence lemon. Method: Beat eggs until light, dissolve the butter in the boiling water and essence of lemon, stir in the flour, put in a sandwich tin, and bake for 10 minutes. *Ginger Sponge*—2ozs. butter, 2 eggs, 1 cup sugar,  $\frac{1}{2}$  cup treacle,  $1\frac{1}{2}$  cupfuls flour,  $\frac{1}{2}$  cup milk, a little grated nutmeg, 1 teaspoonful each of ground ginger, spice, and carbonate of soda. Beat butter and sugar to a cream, break in eggs, and beat well, add treacle and beat again, add all dry ingredients sifted together, and lastly the milk. Cook in greased sandwich tins for 20 minutes. When cold put whipped cream between layers, and cover with thin icing, and arrange pieces of preserved ginger on the top. *Almond Toffee*—2 cupfuls sugar,  $\frac{1}{2}$  cup water, dessertspoonful vinegar,  $\frac{1}{2}$  teaspoonful of essence lemon. Boil until it will harden when a little is dropped in water, pour on plates and strew with toasted almonds. *Jubes*— $\frac{1}{2}$ lb. of sugar, 1oz. gelatine, and 1 cup water. Boil sugar and water for 10 minutes, and soak the gelatine in a cup full of boiling water, then stir in the gelatine and boil for 15 minutes. Pour in 2 plates, color half with cochineal, flavor with essence lemon and pineapple. Let it stand all night in a cool place. (Secretary, Mrs. E. Wall.)

#### WARCOWIE (Average annual rainfall, 12.16in.).

The Chairman (Mr. T. Ryan) presided over an attendance of nine members and 70 visitors. Addresses were delivered by Messrs. E. L. Orchard and F. C. Richards, of the Department of Agriculture. The meeting concluded with a dance. (Secretary, Mr. A. Crossman.)

#### WEPOWIE (Average annual rainfall, 13in. to 14in.).

July 22nd.

On July 22nd members of the Branch and a large attendance of visitors, in company with Mr. W. J. Spafford and Mr. E. L. Orchard, of the Department of Agriculture, made a tour of farms in the district. Ten members and 20 visitors attended the meeting which was held in the evening, when addresses were given by Messrs. Spafford and Orchard. (Secretary, Mr. E. Rooke.)

#### WILMINGTON (Average annual rainfall, 17.78in.).

Mr. H. C. Pritchard (General Secretary Agricultural Bureau) delivered an address, "Keeping Farm Accounts," at the meeting held on July 15th, which was attended by 20 members and a visitor. (Secretary, Mr. G. Fraser.)

#### WILMINGTON (Average annual rainfall, 17.78in.).

Meeting held August 13th. Present: 17 members. The Secretary, Mr. G. Fraser, contributed an interesting paper, "How High Tariffs Affect the Producer."

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

##### BEETALOO VALLEY. (Average annual rainfall, 23.50in.).

Meeting held August 4th. Mr. H. Cook presided over an attendance of 14 members and visitors. Mr. E. L. Orchard (District Agricultural Instructor) addressed the meeting on the subject, "Crop Competitions." A programme of meetings was also arranged. (Secretary, Mr. J. Halse.)

The Annual Meeting was held on July 8th, there being present 14 members and a large number of visitors. The Secretary, Mr. J. Halse, read the Annual Report, and addresses were delivered by Messrs. H. C. Pritchard and E. L. Orchard, of the Department of Agriculture.

##### BELALIE WOMEN'S (Average annual rainfall, 17.95in.).

Mrs. Mitchell presided over an attendance of 23 members and 25 visitors. Miss E. Campbell, Dip. Dom. Econ., of the Education Department, delivered an address, "Home Dressmaking." (Secretary, Mrs. E. Orchard, Jamestown.)



**BOOLEBOO CENTRE** (Average annual rainfall, 15.41in.).

Meeting held July 21st. Present: 11 members and visitors. Addresses were delivered by Messrs. W. J. Spafford and E. L. Orchard, of the Department of Agriculture. (Secretary, Mr. C. Patterson.)

**CALTOWIE** (Average annual rainfall, 16.94in.).

July 21st.—Present: 32 members.

**TRACTOR v. HORSES.**—In collaboration with Messrs. F. Lehman and L. Catford, the following paper was read by Mr. M. Both:—"In a comparatively short time the tractor has superseded the horse in this district, and this is in keeping with the progress that agriculturists have made in other spheres. The teamster takes as one of his chief arguments in favor of horses that the tractor is not an economical investment from a national viewpoint. The fuel must come from an outside source. The extra sheep that can be carried on the farm and the extra area put under wheat as a result of the use of the tractor assume reasonable proportions when the whole State is taken into account. With my collaborators we have computed a scale for an average sized farm for this district—300 acres. Whilst the estimates have been made fairly liberal, no account has been taken of the extra labor the farmer does for the team, neither has the fact that the quality of horse teams varies greatly—the better the team the lower the costs, and *vice versa*—been considered. For hay, it has been thought that the farmer would have to let the carting or purchase a lorry. For an average distance from the town (six miles) and for this acreage (300) it was decided that the lorry would be more convenient and cheaper. Quite a large item in the costs is taxation, and if these were not taxed other sections of the farm would have to pay to balance the budget. Costs—Tractor  $6\frac{1}{2}$  per cent., depreciation 10 per cent., maintenance  $5\frac{1}{2}$  per cent. =  $22\frac{1}{2}$  per cent. on £500 = £110. Fuel, 1,000galls. at 1s. 6d. = £75; lubricant, 50galls. at 6s. = £15. Lorry,  $\frac{1}{2}$  per cent. interest, depreciation 10 per cent., tax  $2\frac{1}{2}$  per cent., maintenance 5 per cent., fuel 5 per cent. = 29 per cent. on £220 = total £264. Horses—Interest  $6\frac{1}{2}$  per cent., depreciation 10 per cent., maintenance  $2\frac{1}{2}$  per cent. = 19 per cent. on £350 for 12 horses and harness = £66 10s. Interest  $6\frac{1}{2}$  per cent., depreciation 5 per cent., maintenance 2 per cent. =  $13\frac{1}{2}$  per cent. on £150 for chaff-cutting plant, binder, &c., £19 10s. Wheat off lay land, 40 acres at seven bags at 4s. bushel, £168 = total £254. These figures would vary according to the size

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of the farm. A large farm would require a larger tractor, but a greater number of horses. The care of the tractor is small when compared with horses. No chaff cutting, stable cleaning, harnessing, and a host of other jobs. In dry years the horse still has to be fed, the tractor ceases to eat the moment the engine is switched off. Again, the team must be kept in working condition; feeding must be continued, though expectations of rain are not fulfilled. Also in a very dry year the lack of water might become a very serious problem. The present day tractor is so simple that little mechanical skill is required to operate and care for it between overhauls. The tractor in an indirect way lightens the task of the women on the farm. Labor troubles are practically eliminated, and the same can be said of insurance against accidents. The tractor allows more time for recreation. But perhaps the greatest advantage of the tractor is the speed of operation. In general, the tractor's speed may be said to be 30 per cent. above that of any horse team. Especially is this so during seed time and harvest. Occasionally one hears of the tractor bogging in seed time. In such cases the land should not have been worked whilst it was in that condition. The harnessing of the team and feeding at mid-day means much loss of time, which the tractor would utilise to its fullest extent. The gain for equal working hours of both is nearly half as much again in favor of the tractor. Even if the tractor does break down, the time lost in effecting repairs can be made good by the speed which the tractor has at its command. The present day spare parts service system is so efficient that the very minimum of time is lost.

**THE CASE FOR THE HORSE.**—This was the subject of the following paper read by Mr. W. Neate:—"It appears to be the general opinion to-day that farm tractors have come to Australia to stay, and if the progressive invasion of our fields and corresponding decline in the number of our draught horses were to be accepted as adequate evidence, there is at present apparent justification for this view. Nevertheless, since farming is primarily a business, however great the technical efficiency of farm tractors, and however great their attraction in other directions, they cannot hope to stay unless they can justify their use and prove that they can provide the tractive power needed on the farm at a lower cost than that provided by the horse. Although tractors appeared in Australia over 20 years ago, it is only during the last five or six years that they have come into general use. During that period we have not had an opportunity, to make a comprehensive test with the tractor against the horse under really adverse circumstances, for during this period we have not had a really wet winter. As most of the records and working costs of the tractor are taken under favorable working conditions, it would be interesting to find out how they would compare with the horse under unfavorable working conditions. My experience relative to this point is as follows:—During the seeding of 1929, under very favorable working conditions, it required 13galls. of fuel to work 30 acres, but after a rain, when the ground had become sodden and some patches boggy, it required 23galls. to drill the same acreage. This is a point that is often overlooked when comparing the two systems. At the present time it behoves us to use only those methods that tend toward the reduction of production costs. The farm tractor is handicapped at the outset on four very important points—high initial cost, rapid depreciation, liability to break down requiring costly repairs, and high fuel and oil costs. From data collected by the Department of Agriculture from 115 farmers using tractors, it was found that the average tractor of 24 B.H.P., costing £450, did the work on the farm equal to 11 horses. Taking the first point, 'initial cost,' let us see how they compare—one 24 B.H.P. tractor, costing £450; 11 horses at £20, £220. I have taken the sum of £20 a head for the horses, as I consider it quite possible to get together a good team at that price. The next point is depreciation. In order to fix a basis for this point, it is necessary to establish the life of a tractor. In the United States of America, from whence most of our tractors are derived, the average life of a tractor is computed at five years. Taking the useful working life of the draught horse at 10 years, this is how they compare under the heading of depreciation—One 24 B.H.P. farm tractor cost £450, average life five years, £90; 11 horses cost £220, average life 10 years, £22. It seems a rather low amount to allow on the horses, but when we consider that a horse purchased at four years will increase in value up to seven years of age, this amount is reasonable. Again, it is possible by careful handling and rearing a foal or two each year to keep the team up to standard and reduce depreciation to a minimum. It is often claimed for the tractor that it is possible, when conditions are favorable, to perform the maximum of work in the shortest time, this certainly is true and is an advantage in seeding and harvest time, but like any other mechanical appliance, this advantage is likely to be lost by breakdowns, which are serious if they occur at a critical time, involving loss of time and heavy costs for repairs. Breakdowns become more frequent as the tractor advances in years, until patching up becomes too expensive and the tractor has to be scrapped. It will be said that horses, too, are liable to ailments and accidents, but these are not usually costly in themselves, nor apart from exceptional epidemic outbreaks, is the whole team affected simultaneously; it is always possible to carry on with a horse or two short, but when anything goes wrong with the tractor the whole plant is held up. It is



claimed as cash advantages to be placed to the credit of the tractor that (1) they leave available for grain areas which in their absence would be cut for hay and fed to horses, and (2) grazing areas which, instead of maintaining horses, could be used for revenue-earning livestock, such as sheep. These advantages are no more than a set-off to the cost of fuel and oil for the tractor. These costs are also affected by the decline in wheat prices and lighter crops. With the tractor equal to 11 horses working 300 acres of crop it would be necessary to provide at least 50 tons of hay for the horses for the 12 months. In a good season a crop yielding 8 bags to the acre should cut 2 tons of hay per acre. Thus 25 acres yielding 200 bags of wheat at 5s. per bushel, £150. In a leaner year yielding 5 bags, or  $1\frac{1}{2}$  tons, it would be necessary to cut 34 acres, yielding 51 tons of hay, or 170 bags of wheat, which, at 4s. per bushel, would return £102. We would have our yearly supply of hay, but after allowing for agistment for the horses, would be at least £35 short with the tractor. One of the main reasons advanced by many farmers for scrapping their horses is to escape the drudgery connected with the horse. This is changing one form of drudgery for another; the tractor certainly needs a lot of care and attention. To the mechanically minded this work might not be irksome, yet the same could be said of the lover of the horse. The most important aspect of the tractor question is taken from a national viewpoint. Tractors, fuel, and oil we import from abroad; horses and their foodstuffs are direct products of the soil. Every drop of fuel and oil and every pound that goes towards the purchase of a tractor represents a dead loss to the district, while all that is required for the horses is the soil and the labor of our hands. We have only to take stock of our country towns since the advent of the motor car and tractors. A few years ago every town of any size boasted a blacksmith, and a saddler's shop, but to-day a large number of blacksmiths have gone out of business or turned their shop into a garage, whilst the saddler is non-existent. At that time the money made in the district was spent in the district, but now the majority is leaving the State, and this is largely responsible for the stringent financial position we are in at the present time. Another aspect of the case is the detrimental effect tractors are having on the quality of draught stock. When the demand for a good horse was keen it encouraged good judges to procure the best stallions, and their services became available in the district, with consequent improvement in our stock. I drove horses for 30 years, and although I have been wholly a tractor farmer for five years, I am strongly of the opinion that under present conditions the draught horse is the most economical source of traction on the farm." (Secretary, Mr. R. Wilkinson.)

#### KOOLUNGA (Average annual rainfall, 15.61in.).

Mr. H. Spencer presided over an attendance of 14 members and visitors at the meeting held on August 4th, when an address, "Hints on Classing the Farm Clip," was delivered by Mr. A. H. Codrington, Wool Instructor of the School of Mines. (Secretary, Mr. E. Le Page.)

#### KOONUNGA.

Mr. J. B. Harris (District Agricultural Instructor) gave a pruning demonstration and address on July 11th, there being present 25 members and visitors. (Secretary, Mr. G. C. Cartwright.)

#### MOUNT BRYAN (Average annual rainfall, 16.87in.).

On the occasion of the Annual Meeting, which was held on July 19th, the report of the year's work was presented by the Secretary, Mr. H. Edwards, and officers elected for the forthcoming session.



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"isothermal layer," or the layer of equal temperature. There is the region of permanent tranquility, all weather changes, storms, &c., originating and existing below 30,000ft. Above this level blow the constant air currents which are due to dynamic causes, also controlled by the equatorial heating and the polar cooling of air above those regions. In our latitudes there is a strong westerly wind blowing just below this level. In Australia all the States as they became settled had their weather stations in operation, and in 1907 the Commonwealth Bureau was established in charge of Mr. H. A. Hunt. Forecasts are issued by each of the State Bureaux, while weather maps are published daily by nearly all the newspapers to-day. Wireless is a great aid in the issuing of special forecasts. A wireless station is situated on Willis Island off the Queensland coast, and does useful work in issuing warnings of the approach and intensity of the tropical cyclones which move towards the Queensland coast during the warm months of the year. There is no doubt that with the rapid means of modern communication and annihilation of time and distance by wireless telegraphy much will be done in the future towards the solution of the problems involved in seasonal forecasting by the accumulation and co-relation of data obtained from meteorological stations in both tropical and antarctic regions. The benefits to mankind in this connection would be inestimable. Let us examine the construction of the weather map, which appears daily in the papers, issued by the Meteorological Bureau. Scattered throughout the Commonwealth are an army of observers—postmasters, school teachers, &c.—about 5,500 in all, whose duty it is to take observations of weather conditions occurring at 9 a.m. Melbourne time. These records consist of wind direction and velocity at surface, type, altitude, and direction of various cloud layers (if any), temperatures, humidities, and, most important of all, the barometer reading. This reading is reduced to sea level, since altitude reduces the reading to the extent of  $\frac{1}{1000}$  in. in 900ft. It is also corrected to  $32^{\circ}$  F. since mercury expands with heat and so affects the reading. Finally, the reading is corrected to what is called standard gravity, *e.g.*, latitude  $45^{\circ}$ . This is necessary since the earth is not a true sphere, but is flat at the poles. Hence gravity is stronger at the poles or adjacent to them than it is at or near the equator. Therefore, in the construction of the weather chart all readings are corrected to the mean of the extremes, *i.e.*, Latitude  $45^{\circ}$ . Suppose we take, for example, a typical winter chart which occurred on July 6th. We shall first consider the wind directions as shown on the map by arrows flying with the wind. The arrows show that over the greater part of the continent winds were blowing around a centre situated to the north of Eucla. They were blowing outwardly from the centre, and the whole stream of air was moving in a counter-clockwise fashion. This great whirl in the atmosphere is called the "anti-cyclone," or commonly, a "high." The very name suggests an opposite system, or atmospheric whirl. On the map issued for the morning of April 4th, 1929, it is noticed that winds were blowing around a common centre, but were moving in a clockwise manner, and tended to converge into the centre, the whole stream rotating in the opposite way to the "high." This system is the "cyclone," commonly called the "low." This "low" lies over south-eastern Australia, and we can see the clockwise inward tendency of the surface winds quite distinctly. These "highs" and "lows" give all the changes and types of weather which we experience from day to day. But an even more interesting fact is shown when we take all the barometer readings sent in to the Central Bureau, and join up by a line all stations having the same corrected barometer reading. We find we have drawn a series of more or less concentric curves and circles, and these lines of equal barometric pressure are called "isobars." We see how closely the wind circulation agrees with the pressure distribution. The centre of "high" near Eucla is seen to have the highest pressure, where the central isobar reads 30.4". There the barometers on this isobar all read 30.4" after correction. Inside they are a little higher. The "low" also has its lowest pressure where the clockwise winds converge. The central isobar here reads down to 28.3". We see also that the winds appear to blow from regions of high to regions of low pressure; not directly as water does, but in a spiral manner. In the anti-cyclone is seen that the winds turn to the left as they move outwards, and so the whole system becomes a swirling mass of air tending to the left. The left-hand tendency of the winds of the high were first explained by Ferrel, who showed that, in the Southern Hemisphere a body when projected across a revolving sphere turned to the left. So a mass of air moving from high to low pressure is acted upon by this law and deflected to the left, and so flows out spirally anti-clockwise. But it is only at the surface that the spiral outflow occurs across the isobars; from 3,000ft. upwards the circulation coincides with the isobars, for here the Ferrel effect is unimpeded by friction or rising air currents off the hot earth. So we find that the high is a mass of air rotating in a counter-clockwise fashion, whose winds at the surface blow out spirally from the centre, but above the surface the circulation flows parallel to and around the isobars. The air in the centre of a high is descending, flowing down to earth where it blows out spirally as explained. This air is dry, and is warmed slightly by compression as it sinks. Hence the "high" is a fine weather system, since rain is produced by the uplifting of air. "Highs" are nearly always clear in the centre, but the eastern and



south-eastern margins are cloudy, because their winds blow from the south-west and south in front of them and bring up cold air from the Southern Ocean, which condenses the moisture in the air by cooling. A north-easterly and northerly wind on the western side blows from off the interior, and is therefore hot and dry in summer. At the centre it is calm to variable, as we would expect. In winter the rear winds of the "high" are cold, since the interior of the continent is then cold. Hence, temperature is controlled by their position. If a "high" is to the westward, cool weather occurs; if the centre is passed the winds veer northerly and temperatures rise. In summer it becomes hot, and if the "high" remains stationary in that position a heat wave occurs. "Highs" generally move from west to east about 300 miles per day, but they have a tendency to linger for long periods over the south-eastern part of the continent where the cold highlands are favorable for their existence, and frequently they increase in intensity and cause a heat wave in summer or a fine spell in winter. This winter, their persistency over this area has been most marked, causing high barometers and prolonged dry weather in South Australia. When the "highs" become very widespread and intense with barometers up to 30.6 they are very hard to displace, and

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frequently deflect "lows" in Western Australia to a south-easterly course away from their normal westerly track, which would bring rain to South Australia. Several instances have occurred this winter. The "low" or barometric depression is in all respects the converse of the "high." It rotates in a clockwise fashion whose surface winds blow into the centre spirally. In the upper levels its circulation also flows around the isobars. The air in a "low" is ascending, carrying up quantities of water vapor. As the air ascends it expands and cools, which is the principle involved in all rain and cloud production. Hence the "low" is a rain developer, and causes an unsettled state of the weather. The uprising air later flows out in the upper levels of the atmosphere about 30,000ft. near the isothermal layer before mentioned is caught in the upper westerlies and there descends to earth again down the centre of the "high" to the eastward. So there is a complete circulation going on between the two pressure systems—the surface air of the "high" being carried up through the rising swirl in the "low," to be again brought down through the descending currents of a "high." "Lows" prefer the ocean, for moisture is necessary for their existence. When they move inland they frequently lose energy and disappear. They also drift from west to east in the general drift of the atmosphere in our latitudes at an average rate of 25 miles per hour. The atmosphere has weight, and equals about 15lbs. per square inch at sea level. This weight is equalled by a column of mercury in the barometer about 30in. high. But instead of the barometers all being the same average level at all places at sea level we find that the average air pressure is greater in certain latitudes than in others. For example, along Lat. 35° S. is the belt of greatest average world pressure of about 30.05". But along Lat. 70° S. near the Antarctic Plateau lies a belt where pressure on the average reads 29.11". The region of greatest world pressure, i.e., the belt of the strongest anti-cyclones, crosses the southern half of Australia. This accounts mainly for the low rainfall of Australia and the arid drought of the interior. The other pressure belts of the world are:—The North Polar high pressure belt; the Arctic low pressure belt; the northern high pressure belt along Lat. 40° N.; the broad equatorial low pressure belt; and the Antarctic high at the South Pole. Hence, Central Australia lies too far south for the copious rains of the tropical low belt, and too far north to share in the winter rains from the Antarctic low pressure systems which surge up from the Antarctic low pressure belt. Hence, since the pressure control in Central Australia is adverse, high mountain ranges or inland lakes would not increase the rainfall there. We find similar arid regions in other countries which lie in the same high pressure belt; South America and South-West Africa in the Southern Hemisphere are almost rainless in summer, because the pressure systems are anti-cyclonic, and fail to produce rain even by cooling the winds blowing over the Andes 25,000ft. high. The three pressure belts which concern Australia are the equatorial low, the high pressure belt over Northern Australia, and the Antarctic low. These belts are not constant, but are broken up into several centres or foci, which in turn give rise to the familiar "highs" and "lows" which we have already noted. These pressure belts are not constant as regards latitude, but they swing north and south annually in accordance with the north to south swing of the sun from winter to summer. Hence in winter, as the sun apparently retreats northwards to the Tropic of Cancer, the average track of the "highs" tends to keep further inland over Australia, e.g., from Perth to Rockhampton, in mid-winter. This allows the southern "lows" to surge up and sweep the southern coastline, giving our winter rains. When, for any cause, the "highs" keep an abnormally southern track in winter, our winter rains are scanty, as the "lows" are kept well down south from our coasts. Such has been the case during the dry spell this winter. As the sun again approaches us to the Tropic of Capricorn in mid-summer, the "highs" take a course along the Southern Ocean, and the tropical lows of Australia develop to give the copious summer rainfall in the tropics. The southern "lows" are forced south again, and so the summer here is, under the control of the "highs," practically rainless. Occasionally a tropical or monsoonal "low" from the tropics drifts southwards over South Australia, and may give heavy summer rains. A very important feature of meteorology is the presence and variation of the moisture contained in the air in the form of invisible aqueous vapor. If water be exposed to the air it will sooner or later evaporate; of most vital importance is this fact in dry Australia. Only along the east and south coasts are there any places where rainfall equals evaporation. Central Australia has tremendous evaporation in a year, nearly 9ft., while the rainfall is 9in.—obviously the reason why vegetation is scanty. Boulia, in south-western Queensland, has an evaporation annually of 124.5in. Locally we average 4½ft. evaporation per year, with a 19in. rainfall. Evaporation is due to the dryness of the air. When a body of air contains all the vapor it can hold it is said to be "saturated" at that temperature. By raising the temperature we increase the amount of water vapor it can hold. By lowering the temperature we compel some of the vapor to be condensed as mist, the air of course remaining saturated. This is important, as it represents the process of cloud formation. The actual amount of vapor in the air is called the "absolute humidity," which is that portion of the barometric pressure due to water vapor in the air. In Adelaide this is



low, but in the tropics it amounts to over .5 of an inch. Relative humidity refers to the actual amount of vapor present compared with the total amount which the air can hold at that temperature. It is expressed in percentages. Saturated air, then, has a relative humidity of 100. Relative humidity is estimated from the readings obtained by the wet and dry bulb thermometers. When the temperature is low, the air cannot hold very much vapor; hence the saying "Too cold to rain" is not without scientific truth, since with low temperatures preceding the advent of a barometric depression rain development is doubtful. When warm, moist air is cooled in any way it reaches a point where it is forced to give up some of its vapor in the form of cloud. This point or temperature is called "dew-point." When water vapor is condensed from vapor to mist or liquid, a certain amount of heat is set free termed latent heat. This heat set free is a form of energy, and is largely the source of energy and violence of tornadoes which play havoc occasionally in the humid tropics. In South Australia the humidity is low, hence tornadoes are rare, and only occur when streams of tropical air flow south under certain isobaric conditions. Since rain is the most vital factor in Australian meteorology, we will now briefly refer to the principles involved in the precipitation of that priceless necessity. Rain may be developed in three ways:—(1) By the effects of convection on a hot, humid day when the heated land surface gives rise to ascending air currents which, when cooled by ascent, form the characteristic summer thunder cloud which, provided the cause is maintained, ultimately precipitates rain. (2) By coastal uplift of masses of moist air which is cooled by ascent and clouds and rain condensed. Examples occur anywhere where winds blow off the ocean over mountain ranges. (3) By the mechanical uplifting and cooling on the grand scale such as occur in the low pressure system or barometric depression. This is the way a general rain is developed, and which South Australia looks for every season. The ideal weather map for a rain of this nature in South Australia is one where an energetic "low" is located over South Australia, and is bounded on either side by two "highs," each having plenty of strength, and the eastern one maintaining its position. There is then brought about an uplifting of the air over South Australia by the action of the "low" in which the air is ascending. When this air ascends it is cooled by expansion, so that its moisture vapor is condensed into cloud. First the wispy cirrus is seen at 30,000ft., then the various other cloud types at lower altitudes until, provided the "low" does not move away too quickly, rain commences to fall, and continues more or less until the centre of the "low" passes eastward, when a shift of wind from north through west to south-west occurs, and the passing showers occur. Such uplifting of large masses of air requires enormous energy. We can judge whether a "low" or "high" is weak or strong by the number of isobars enclosing it. If several isobars enclose a low, and the central one reads 29.6, that low is fairly energetic. In the production of 1 in. of rain over one square mile it is estimated that an amount of work is expended equal to that done by 100,000,000 horsepower in half an hour. Such forces are involved in an ordinary thunder shower, while the energy required for the precipitation of a general rain over South Australia of an inch or more is utterly beyond the resources of man. Surely these facts are a complete answer to the claims of the rain maker. Rain cannot be induced to fall simply by spraying a heavy cloud with salt, or any other process. In fact a heavy cloud many thousands of feet in thickness, such as a cumulous or thunder cloud, only contains actually a few points of rain over an area equal to its base. In order to "burst" or rain a cloud must be fed from below with ascending currents. Then rain will fall as fast as it is being condensed in the rising current. If the ascent is over 20ft. per second a thunderstorm will occur; otherwise it will be purely a shower. Unless Nature is doing this work of feeding a cloud it is ridiculous to attempt to cause a cloud to rain any appreciable amount. The better an amateur can grasp the nature of the "highs" and "lows" and the behavior of the upper air movements in relation to them, the more proficient and expert will he become as a forecaster from day to day. Sir Napier Shaw says, "A modern meteorologist thinks in maps." Hence, the amateur has to take stock of the conditions around him—the movement of the barometer; the drift, type, and velocity of the various cloud layers; and the direction and strength of the surface wind, temperature, &c.—and from these construct a mental weather map to fit in with the known weather conditions; then think out from that mental map what the future weather is to be. It is quite easy to decide from these observations if our weather is controlled by a "high" or a "low," and where their centres are located, &c. By these means it is possible for the amateur to foresee practically every change at least a day ahead, and to arrive at a reasonable estimation of the probability or otherwise of rain developing by estimating the energy of the disturbance on the mental weather chart so constructed. A weak "low" may produce considerable cloud but stop at that, whereas the expert observer detects the approach of an energetic "low," and forecasts accordingly. Wind, hail, snow, heat waves, and frosts are very easy to predict by following closely the movements of the weather systems from day to day.



**BALAKLAVA** (Average annual rainfall, 15.99in.).

The annual meeting was held on July 28th, there being present 10 members. The annual report and balance-sheet was presented, and officers elected for the ensuing term. (Secretary, Mr. A. Paterson.)

**BROWNLOW.**

July 16th.—Present: 14 members.

**CARE OF HARNESS.**—Mr. T. Steinborner read the following paper:—"All harness should be attended to at least once a year. The best way to treat harness is to apply saddler's oil with a small brush. Used motor oil, lard, or fat will answer the same purpose. Oiling harness is most necessary for better and longer service, and to keep down the cost of repairs. The collar should be kept soft and smooth to avoid sore shoulders. When not in use it should be kept out of the rain and sun; a hard uneven collar is one of the chief causes of sore shoulders. To avoid confusion, each set of harness should be kept by itself. A riding saddle and a part of all reins should be treated with leather soap." In the discussion which followed a member said harness should be washed with warm water and soap before being oiled, and that should be done twice a year. Another said it was a good plan to soak a new collar in water before using the first time. The collar would then work to the shape of the horse's neck. (Secretary, Mr. T. Partridge.)

**BUCHANAN.**

Fifteen members and three visitors attended the meeting held on August 15. The annual report was read by the Secretary, Mr. L. Bell, of Marrabel, and officers elected for the ensuing 12 months.

**EUDUNDA** (Average annual rainfall, 17.19in.).

Six members attended the meeting held on July 7th. The annual report was presented and officers elected for the ensuing year. (Secretary, Mr. L. Duldig.)

**HOYLETON** (Average annual rainfall, 17.56in.).

Papers dealing with the subject, "Modern Methods of Farming," were contributed by Messrs. P. Saunders and C. Chapman, at the meeting held on July 21st, which was attended by Mr. J. Sandow (Chair) and 16 members. (Secretary, Mr. W. Chapman.)

**LYNDOCH** (Average annual rainfall, 23.71in.).

Mr. A. Springbett presided over an attendance of 21 members and three visitors. The Chairman presented prizes to the successful competitors in the recent pruning competitions. In recognition of his services as Secretary for 19 years, Mr. J. S. Hammatt, of Williams-town, was tendered a banquet and presented with a framed Life Membership Certificate of the Agricultural Bureau.

**OWEN** (Average annual rainfall, 14.22in.).

Meeting held June 10th. A large number of members and visitors attended the meeting, when Mr. B. Crewe delivered a lecture illustrated with moving pictures, "Petroleum and Its Products."

Officers were elected at the annual meeting which was held on July 11th. There were present 15 members. (Secretary, Mr. A. Bowyer.)

**ROSEDALE.**

Sixteen members and three visitors attended the meeting held on August 12th, when an interesting paper, "Fallowing and Its Benefits," was read by Mr. H. Nettlebeck. (Secretary, Mr. H. Muegge, Sandy Creek.)

**SADDLEWORTH** (Average annual rainfall, 19.65in.).

July 11th.—Present: 17 members and two visitors.

**HAND-FEEDING SHEEP.**—Mr. H. Kingston read the following paper:—"An essential part of farm management on those holdings on which sheep are carried is to make adequate provision for times of shortage for hand-feeding the flock. With the adoption of this practice, all the sheep become very quiet, and are easily handled. I give preference to feeding on grain, either oats or barley. The grain can be sprinkled on patches of hard bare ground, or in troughs constructed with flooring boards or galvanized iron. Forty feet of troughing will be found sufficient to accommodate 50 ewes, and when the lambs are from eight to 12 weeks old, additional troughing should be provided. It is important to see that sheep which are being hand fed have free access to plenty of water. Mr. F. Coleman gave a short address in which he gave an account of a trip to Queensland. (Secretary, Mr. A. Blundell.)



**TWO WELLS (Average annual rainfall, 15.88in.).**

Meeting held July 28th. Present: 10 members and visitors. Mr. B. Paech contributed an instructive paper, "Wheat Diseases." Officers were also elected for the ensuing 12 months. (Secretary, Mr. M. Pratt.)

**WASLEYS.**

Mr. E. Fischer presided over an attendance of 39 members and visitors at the meeting held on July 10th. Papers on the subject, "Motor Power on the Farm," were read by Messrs. F. Dimont and R. Richter. (Secretary, Mr. C. R. Currie.)

**WINDSOR.**

July 29th.—Present: 22 members and visitors.

On the occasion of the Annual Meeting a report of the past year's work was presented by the Secretary, Mr. R. Ford. In the course of his remarks the Secretary expressed his gratification at having been able to report a record year in the activities of the Branch. There had been an average attendance of 27 members at each of the nine meetings held during the year. Addresses were delivered by Messrs. W. C. Johnston and F. C. Richards of the Department of Agriculture.

**YORKE PENINSULA DISTRICT.****(TO BUTE.)****BOOR'S PLAINS AND THRINGTON.**

July 3rd.—Present: 25 members.

**FALLOWING.**—Mr. S. Chynoweth read the following paper:—"In the wheat belt the summer is practically rainless, and the wet season does not begin until about April. The crop is sown during May and June, and fallowing begins soon after. Thus, at least three months' wet weather normally occurs before fallowing begins, and four and possibly five months before it is finished. At first, all the rain soaks into parched soil, but sooner or later, especially during heavy falls, the soil cannot take it up fast enough. A good deal runs off the paddocks, and some lies about in shallow pools and soon evaporates. When the plough is started in July one has started early enough for first class winter fallow, but even then it is not possible to trap the rain which has run off or evaporated during the three preceding months. That can only be done by summer fallowing. Not only does summer fallow catch the early rains, but it is advantageous from several other points of view. *Summer Fallow.*—The land is opened up in February, March, or April, and lies bare for 14 or 15 months before it is sown. This method, however, cannot be employed regularly on those soils which cannot be broken up in the absence of rain; but, on the other hand, there are extensive areas which are more easily broken up dry than when wet. On very loose soils it is sufficient in the first operation to merely stir the soil 2½ in. deep with a spring-toothed cultivator, but, if necessary, the plough scarifier or a one-way cultivator will do satisfactory work. If the soil breaks up rough it is desirable to harrow it, and then it may be left until after the drilling season. The early tillage promotes a profuse germination of rubbish when the first rain comes. Sheep should be given access to the paddock, but once weeds get too far ahead it will be necessary to get rid of them by cultivation. At this stage, generally a scarifier will be equal to cutting weeds, and at the same time stirring the soil to a depth of about 2 in. or 3 in., but if a light implement is used for the first operation a plough may have to be used for the second working. Later, as rubbish appears, it must be killed by using the lightest implement that will do the job satisfactorily. As the spring advances, the aim should be to create a well-defined mulch of loose, mellow soil about 2 in. deep overlying a firmly consolidated seedbed. On soils which have a tendency to run together, the mulch should be left comparatively cloddy, but on good loamy soils, it can be fairly fine. The effect of the mulch is to reduce to a minimum the evaporation of moisture previously stored in the soil. As summer advances, an occasional "sheeping" of the fallow will suffice to prevent any oats from seeding, but should ½ in. or so of rain fall it will generally pay to give a quick harrowing to break any crust that may have formed on the surface. It is very important to recognise that a crusted surface is one through which moisture evaporates at a faster rate than through a loose surface. By permitting the crust to remain, the whole of the moisture previously stored may be lost. In the following autumn, after the weather breaks, the land can be worked up, and then, after allowing sufficient time for weeds to germinate, sown with a combined drill. Further, the germination of wheat is stimulated. Nothing better for the promotion of a good sprout of rubbish on a paddock has been discovered than to summer fallow it. Thus the system can be employed to clean up the dirtiest paddocks on the farm. When a paddock which it is intended to fallow is particularly foul with weeds it is sometimes



found desirable to restrict the first operation to a light cultivation. In this way the seeds are not buried deeply to become a menace in later years. They sprout immediately, and may be destroyed. As a word of warning to the man who is summer fallowing a dirty paddock for the first time I would say, do not do it unless you can cope early with the growth promoted, otherwise the paddock may have to be re-ploughed, and at the best an unsatisfactory result obtained. Rather than attempt to summer fallow all the land it is intended to crop, it will be most economical to treat half in that way and winter fallow the rest, thus the available labor on the farm can be most economically distributed. Some of the heavy work can be undertaken in February and March, when the teams would otherwise be idle, and the balance can be left until after seeding. The practical advantages in respect to weed killing and the distribution of labor should stamp the practice as worthy of adoption wherever it can be employed.

*Winter Fallow.*—The time has arrived when the farmer must see what can be done to increase the wheat and hay yields of his holding. Careful cultivation is the principal method of attaining this end. No hard and fast rule for the cultivation of the soil can be laid down on account of the various classes of land that are to be found, even on one farm. It is absolutely essential that every farmer should study and experiment in order to ascertain the best method of working the land on his holding. Generally speaking, ploughing should be commenced as soon as seeding operations have been completed to allow ample time for rain to play its part in the settling down of the ploughed land. Two inches to 3 in. is deep enough for the land in this district to be ploughed. Do not plough the land while it is very wet, otherwise it will be very hard and lumpy when worked back with the cultivator. If the land is turned whilst very wet instead of crumbling as it is turned it will simply turn in blocks, leaving open spaces under the surface, allow the escape of moisture, and makes an imperfect seedbed. The next implement to be used is a set of heavy harrows. These should be used before a hard crust has had time to form on the surface. If no weeds appear and the surface is loose, the land should be left for a time, but if weeds show up the cultivator should be set to work at once. If weeds are small use a spring-tyne cultivator, working at right angles to the ploughing, provided the paddocks are suitable; this tends to keep the surface from becoming irregular, as happens with constant one-way working. The benefits to be obtained by using the spring-tyne implement are:—First, improvement of the seedbed; the fine, loose soil shakes to the bottom, while the coarse and more lumpy soil works to the top, thus enabling one to break it down with the harrows when rain falls. Second, lightness of draught; 10 horses are able to work a 35-tyne cultivator quite comfortably. Third, one man with 10 horses can do a great deal of work with the spring tyne. The land being left ridgy behind this implement, it has a tendency to prevent drift. If the land is free from weeds and no heavy rain falls, the land can be left until autumn. If, however, rain falls during harvesting every opportunity should be seized of working the land; summer weeds are bound to come, and the quickness of growth will cause no end of trouble. If weeds are strong and thick use a bridle cultivator with 6 in. shares or a disc cultivator. Should rain fall at the beginning or up to the middle of April, it will give ample time to allow germination of weeds, and the land could be worked over before seeding. Land at seeding time should be cultivated as shallow as possible, in order not to injure the seedbed and yet deep enough to destroy young weeds. Wheat should be drilled to a depth of 1 in. to 1½ in. Harrow with a set of light harrows about three days behind the drill. For this district the month of May is the best seeding season, and will give best results if sown in June. Later on the ground is too cold, the seed takes longer to germinate, and the plant is weak when cold, wet weather sets in. The earlier sown crops, however, will have firmly established themselves, and will be prepared to fight against hardships. Let us all try and improve our system of cultivation. Each year do a little experimental work of this class. Read and study all papers on this subject, then we will be able to realise what there is yet to learn on this most important subject. (Secretary, S. Chynoweth, Kadina.)

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#### KILKERRAN.

Meeting held July 29th. Present: 12 members. Mr. C. Heinrich read an interesting paper, "A Trip to the West Coast." Officers were elected for the ensuing year. (Secretary, Mr. A. Dutschke, Maitland.)

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#### THRINGTON.

At the meeting held on August 7th, Mr. T. Stanway presided over an attendance of 24 members. The annual report and balance-sheet were read and adopted. Mr. S. Chynoweth won the trophy presented by Mr. H. Queale to the member who proposed the highest number of new members. A social evening was held on July 28th. (Secretary, Mr. S. Chynoweth.)



## WESTERN DISTRICT.

## CHANDADA.

July 18th.—Present: 18 members and four visitors.

**THE CARE AND MANAGEMENT OF THE TRACTOR.**—Mr. R. Loveday read the following paper:—“It has been frequently stated during the course of debates on the relative value of the horse and the tractor, that one great point in favor of the latter was that it could be left at the end of the day’s work and, without any attention, be ready next morning for another day’s work. If, however, that practice is followed to any extent, the operator will soon have plenty of trouble. The reliability and high efficiency of most modern tractors is the reason for much of the neglect from which some tractors suffer. This applies more especially when the machine is new, when the tractor is running so well that the operator is apt to become careless. The tractor, which is an expensive high grade machine, always requiring accurate adjustment of its many parts, should from the first receive regular treatment as regards lubrication, cleanliness, and adjustments. The operator should make himself thoroughly acquainted with the machine by means of the book of instructions and by careful observation when working. After a while a well-trained eye will soon detect any fault. If the operator understands the machine he can visualise the working of all concealed parts, he will realise the stresses and strains to which they are subject, and will probably drive the tractor in such a manner that the least possible strain is imparted to it. **Lubrication.**—The oil in the crank case should be changed when still in good condition. When opening the overflow tap to ascertain the oil level in the crank case, always feel the oil and note the color. Do this when the engine is warm. It is false economy not to change the oil until it has lost its body. Greasing and oiling should be done at the end of the day’s work, when all parts are warm. The lubricant will then percolate freely to all parts of the bearings. Large bearings of the comparatively slow moving type fitted with greasers often retain grease better than heavy oils, especially in hot weather. It is essential that all oil and grease be kept perfectly clean. Have two grease guns, using one for grease and one for heavy oils, thus saving time in giving the correct lubricant to the various bearings. When the crank case is to be drained, have the tractor on slightly sloping ground, the tractor being inclined towards the side where the pipe plug is situated and drain after the day’s work, when the engine is warm. **Ignition.**—All heavy duty engines are somewhat severe on sparking plugs and magneto breaker points. These parts should be examined regularly and adjusted. The correct gaps are—for the spark plug electrodes, 1/64th to 1/32nd of an inch; and for the breaker points from 3 to 4 millimetres. In regular working the former should be examined fortnightly, and the latter every five or six weeks. If the points are pitted, file carefully and leave the surface of the points flat and true. Oil the magneto according to instructions, and clean the breaker mechanism occasionally with petrol. The impulse starter, if inclined to stick, is a frequent source of trouble. To overcome this drill a small hole in the starter cover and either fit or solder therein a small lubricator, such as is fitted to the hub of a bicycle wheel. Kerosine or petrol can then be easily squirted through the impulse starter. **Cooling System.**—Always use clean rain water and keep the level well above the top of the tubes. Every four to six months, according to the condition of the water drain and refill, adding washing soda at the rate of 1lb. to each gallon of water. Run the tractor for a few hours with this mixture, then drain and refill with fresh water. Overheating is sometimes caused by dirty

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water in the system, or a collection of dirt and foreign matter that have blocked a considerable portion of the core of the radiator. *General Adjustments.*—The valve tappets should be adjusted every three or four weeks. During heavy work this point requires particular attention. Remove the crank case, if necessary, and examine the big ends and crank case every six months. Examine cotter pins and make sure they are tight. The carburettor should be so adjusted that the engine will run on the leanest mixture that will give full power without spitting and popping back. A small jet can be used for light work and give economical results. If the machine appears to be laboring and cuts out whilst going over obstacles, fit a jet of a larger size. Set the idling adjustment of the carburettor so that when warm the engine turns over evenly and smoothly. Do not have the engine idling so that it just crawls over from one explosion to the next. This is particularly important when running on kerosine, and the engine should idle faster than if using petrol, otherwise excessive crank case dilution will result through imperfectly burnt kerosine finding its way down past the pistons. Much trouble will be avoided if all fuel is strained when poured into the tank. Steering adjustments should be correctly maintained, and always disengage the clutch thoroughly. Keep the tractor reasonably clean, so that faults can be detected, and place it under cover when not in use. *Driving.*—Loss of compression and power indicates either valve or piston ring trouble. Preferably the tractor should be driven by one man only. When starting from cold, run the engine at a fairly slow pace until warmed up a little, then open up the throttle gradually, and put the tractor to work. The sudden roaring up of the engine is too common a practice, and does considerable harm. Always engage carefully and steadily, and declutch in the same manner. Unless the driver is an expert mechanic, have the regular overhaul performed by an expert. The tractor will respond to good care and management, the same as will a team of horses. Finally, drive the machine with intelligent interest and follow the manufacturer's instructions."

#### CUNGENA, July 9th.

After the annual report had been read and officers elected, Mr. W. J. Spafford (Deputy Director of Agriculture) delivered an address, "Wheat Growing." Twenty four members and visitors attended.

A further meeting held on August 9th took the form of a "Question Box." Discussing the question as to what were the possibilities of establishing a profitable market for eggs on Eyre Peninsula, members thought that some co-operative movement would be necessary to assist in organising the scheme and packing the eggs for export. *The correct way to roll out wire netting.*—Replying to this question, a member gave the following advice:—The tight side of the netting should always be on top. An easy way to roll it out was to put a bar through the centre of the coil, then get two old drill discs and place one on each end of the bar. A small piece of rope should be placed on the outside of the discs, and the netting could then be drawn along easily. Seventeen members attended. (Secretary, Mr. H. Broad.)

#### ELBOW HILL (Average annual rainfall, 11in. to 12in.).

July 9th.—Present: Eight members and two visitors.

The meeting took the form of a Question Box. Is English malting barley any good for hay? Members had had no experience, but thought spines might be injurious. Stock ate barley stubble right to the ground. They liked it much better than wheat or oat stubbles. Barley grain was excellent feed. Points on grubbing mallee stumps? To rid land of stumps with economy one member favored a twin disc plough, especially in shoot-covered land. What are the benefits of co-operation? Mr. Coles said co-operation commenced with the first stages of life which existed between parents and children. It had wonderful power when it was worked properly. He was a firm believer in co-operation. Mr. Payne said co-operation was lacking in the farming industry, but it existed in almost every other industry to its betterment. Primary products were the mainstay of South Australia, and the buyers of these products should co-operate to protect themselves. What is the best preparation for flyblown sheep? The following preparations were recommended:—Uzona and kerosene, Vactick and drained crankcase oil and phenyle mixed. If the keeping of poultry can be proved to be remunerative, to what extent can it be developed? Members favored first-class birds, pure-bred laying strains, true to type. Red Comb eggs realised 1s. dozen more than new laid eggs. Which is the best implement for fallowing—cultivator, share, or disc plough? The disc plough was favored, mostly because of its ability to go through straw and rubbish. It also worked better in stumpy and shooty land. The cultivator was not so effective for killing weeds. (Secretary, Mr. W. Cooper.)



**GOODE WOMEN'S** (Average annual rainfall, 10.20in.).

Meeting held July 5th. Present: 14 members and three visitors. Mr. A. L. Warren (Field Officer of the Department of Agriculture) gave a lecture, "Preserving Fruit." An instructive discussion followed. (Secretary, Mrs. A. Watson, Ceduna.)

**GREEN PATCH** (Average annual rainfall, 27.56in.).

The Annual Meeting was held on July 10th, there being present 10 members. The annual report was read by the Secretary, Mr. C. J. Whillas, of Port Lincoln, and officers elected for the forthcoming year.

**KELLY** (Average annual rainfall, 11.92in.).

Meeting held July 19th.—Present: Mr. C. Freeth (chair) and 18 members. The annual report was read and officers elected. Members discussed arrangements for the forthcoming Conference. (Secretary, Mr. M. Martin, Kimba.)

**KOPPIO** (Average annual rainfall, 22.40in.).

The Annual Meeting was held at the residence of Mr. M. Gardner, there being present nine members. The annual report was presented by the Secretary, and officers elected for the forthcoming year. Supper was provided by Mrs. Gardner. (Secretary, Mr. M. Gardner, White's Flat.)

**LAURA BAY.**

Mr. C. Goddard, of the School of Mines, gave a demonstration of wool-classing at the meeting of July 29th, which was held at the residence of Mr. W. Bowell. During the evening the Annual Meeting was held. Mr. Goddard delivered an address, "The Merino Sheep," and officers were elected. Twenty-two members and eight visitors attended. (Secretary, Mr. W. Edson, Ceduna.)

**LIPSON.**

Mr. H. D. Adams (District Agricultural Instructor) addressed the meeting held on July 23rd. He explained the Egg Marketing Board that had been formed at Cowell, and stressed the value of poultry as a side line to general farming operations. Six members attended. (Secretary, Mr. M. Barraud.)

**MILTALIE** (Average annual rainfall, 13.89in.).

Meeting held July 11th, at Mr. J. Story's residence. Present: 15 members and four visitors. Mr. C. F. Anderson (Acting Poultry Expert) delivered a lecture, "Poultry Farming." Officers for the ensuing year were also elected. (Secretary, Mr. G. Smith, Cowell.)

**MINNIPA** (Average annual rainfall, 14.68in.).

Meeting held July 7th. Mr. C. A. Goddard, of the School of Mines, gave a demonstration of classing a farmer's clip.

On July 25th Mr. S. Billingham, Manager of the Experimental Farm, gave a pruning demonstration.

A further meeting was held on August 7th, when matters of local and timely interest were discussed. (Secretary, Mr. W. Crowther.)

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## NUNJIKOMPITA.

Meeting held July 10th. Present, 13 members and three visitors. Delegates gave a report of the proceedings of the Ceduna Conference. (Secretary, Mr. P. Luestner.)

## PALABIE.

There was an excellent attendance of members and visitors at the meeting held on July 30th, when Mr. H. D. Adams (District Agricultural Instructor) delivered an address, "Soils and Soil Analyses." (Secretary, Mr. E. Rashleigh.)

## PETINA (Average annual rainfall, 13.02in.).

Meeting held July 29th. Present: Mr. W. Schulz (chair), 15 members, and 10 visitors, including members from the Cungea and Wallala Branches. The annual report was read, and officers elected for the ensuing year. (Secretary, Mr. E. Jones.)

## PINBONG.

July 9th.—Present: 10 members.

**ELECTRICITY.**—The meeting was held at Mr. E. Kammermann's residence. The following paper was read by Mr. C. Parker:—"Electricity is one of the most fascinating studies, and there are few people who are not attracted by it. The element of mystery which surrounds it, its wonderful utility, and the many uses to which it can be put all combine to make it interesting. In addition to lighting houses and streets, electricity is now used for heating rooms, cooking, washing, haulage in buses, trams, and trains, it hews coal, saws wood, and grinds corn, &c. Electricity in small quantities can be generated for chemical action in primary batteries, such as are used to work electric bells, telegraph instruments, &c., but for large quantities it must be generated by a dynamo or generator. The current thus obtained can be led along wires and used at a distance for lighting, heating, or driving. In order to use electricity for driving purposes it is necessary to convert it into mechanical power in the form of a motor. Sometimes it is convenient to generate and distribute current in a comparatively small quantity, but at a very high voltage rather than a larger quantity at a moderate voltage, but as it is not convenient to use it either for lighting or for driving at this high pressure, another apparatus, a transformer, has to be used, which converts a small high-pressure current into a large low-pressure current. This appliance can only be used on alternating current mains. The electrical plants as used for farm purposes are usually direct-current machines. Although the initial outlay is high, these plants are a great boon to farmers; also with the aid of electrical appliances the farmer's wife can do sewing, ironing, cooking, sweeping, and washing. Also there are electric fans for hot summer evenings, and the wireless can be worked off the plant. If the electric plant is large enough the farmer can, with the aid of electric motors, work his milking machines, shearing machines, separator, and churn. Farm lighting plants are either direct coupled or belt driven. Most lighting plants for farm purposes are of 32 volts, higher voltage plants being obtainable. The 32-volt plant will light a fair number of lamps, and as the farmer only uses very few lamps at once there is always plenty of current available. The candle-power of the lamps would be in the range of 25 c.p. to 50 c.p., 32 c.p. being a good light, but for a large room a 50 c.p. lamp would be necessary. Of course, one must remember that the higher the candle-power the more current will be consumed. The amperage, or quantity of current consumed, is governed by the candle-power of the lamp. The higher the candle-power the more voluminous is the light, if voltage or pressure is in accordance with that of the lamps, therefore the higher the candle-power the more current consumed per hour. The incandescent electric lamp is very simple. When a current is forced along a conductor of any kind heat is generated into it. By using a very fine "filament" in this way it is possible to heat it to such an extent that it will give out a very bright light. If however, this was exposed to the air it would burn away instantly, so it is enclosed in a glass bulb from which the air has been pumped out. In the old-style lamps the filaments were of carbon, but the more modern lamps have metal filaments which are more efficient. In some lamps the filament is made of metal tungsten, and is supported upon a framework consisting of a glass rod with wire arms projecting from it. The whole is enclosed in a bulb from which the air has been exhausted. Tungsten is of such a nature that it cannot be drawn into a fine wire in the usual way. It is, therefore, reduced to a fine powder and mixed with some suitable binding substance into a paste, which is then forced through a small hole in a diamond so that it comes out a fine thread. This is then subjected to intense heat, which disposes of the binding material and leaves a very fine thread of pure tungsten. The exhausting of the air from the glass bulbs is a very important stage in the manufacture of electric lamps, since unless it is very thoroughly done the filaments will not last long. An ordinary mechanical pump is not good enough



as however well it is made air will escape past the piston and through the valves. Some form of mercury pump is therefore used. In these the mechanical piston is replaced by a column of mercury moving up and down in a glass tube like a barometer or else a series of drops of mercury falling down inside a glass tube acts like a number of small pistons, pushing the air before them as they fall." (Secretary, Mr. C. Scholz, Yaninee.)

#### PINKAWILLINIE.

July 12th.—Present: 19 members and visitors.

The meeting was held at Mr. S. Westover's residence. Mr. E. Atkinson gave a paper, supplemented with blackboard illustrations, reviewing the position of the average settler in the new hundreds. It was shown that although finances were embarrassed, owing to the three years of drought, the average settler had produced sound assets in the form of improvements to his property. The Secretary, Mr. S. Johnson, read the Annual Report, and the election of officers followed.

#### POOCHERA.

Meeting held July 24th. Present: Six members and several visitors. The meeting discussed the matter of holding a crop competition for the forthcoming season. (Secretary, Mr. F. Joy.)

SMOKY BAY (Average annual rainfall, 10.61in.).

A demonstration in wool classing was given by Mr. C. Goddard, of the School of Mines, in Messrs. Lovelock Bros.' wool shed at the meeting held on July 25th. There were present 17 members and visitors. (Secretary, Mr. K. Harrison.)

STREAKY BAY (Average annual rainfall, 14.95in.).

Meeting held July 25th. Present: 10 members. After the annual report had been presented and officers elected, members discussed the subject, "Bookkeeping for Farmers." (Secretary, Mr. C. Thom.)

TALIA (Average annual rainfall, 15.27in.).

Meeting held July 19th. Present: 10 members and three visitors. Matters of local interest were discussed.

A further meeting was held on August 11th. Mr. W. H. Brownrigg (District Agricultural Instructor) delivered an address, "Wheat Diseases, &c." (Secretary, Mr. A. W. Thompson, Elliston.)

#### WALLALA.

The inaugural meeting of the Branch was held on July 24th. Mr. H. Thompson presided over an attendance of 15 members and visitors, including members from the Petina Branch. Officers were elected, and Mr. W. Schulz, of Petina, addressed the meeting on the work of the Agricultural Bureau. (Secretary, Mr. C. Zippel.)

#### WIRRULLA.

An article dealing with Motor Traction was read and aroused an interesting discussion. A programme of meetings was arranged and officers elected. (Secretary, Mr. H. Doley.)

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**EASTERN DISTRICT.****(EAST OF MOUNT LOFTY RANGES.)**

**ALAWOONA** (Average annual rainfall, 10.20in.).

The Annual Meeting, held on July 12th, took the form of a social evening, and was attended by a large number of members and visitors. After the election of officers, vocal and musical items were rendered, and the evening concluded with a social and dance.

A special meeting was held on July 22nd to discuss matters in connection with the Conference of Murray Mallee Lands Branches. (Secretary, Mr. B. Finey.)

**BLOCK E.**

The Annual Meeting was held on July 22nd. The annual report was presented and officers elected. (Secretary, Mr. H. Davies, Renmark.)

**BOWHILL** (Average annual rainfall, 12in.).

Twenty-six members attended the meeting held on August 4th, when Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Cultivating Mallee Soils." (Secretary, Mr. M. Banks.)

**BRINKLEY.**

Nineteen members attended the meeting held on July 23rd. Matters in connection with the Southern Conference were discussed and officers elected for the ensuing year. (Secretary, Mr. C. Pearson.)

**BUGLE.**

There was an excellent attendance of members and visitors at the annual meeting of the Branch held on July 8th. The Secretary (Mr. B. Auricht, of Taldra) presented the annual report and officers were elected. Addresses were delivered by Mr. M. Shannon, of Loxton, and Messrs. R. L. Griffiths and F. C. Richards, of the Department of Agriculture. The meeting concluded with a supper and dance.

**CALIPH.**

Meeting held July 1st. Present: Mr. S. Bunde (Chair), nine members, and three visitors. Mr. T. Flint, of the Alawoona Branch, presented a paper, "Should the Bureau Include Rural Economics in Its Field of Inquiry," which aroused a keen discussion. (Secretary, Mr. W. Todd.)

**CLANFIELD** (Average annual rainfall, 16in. to 17in.).

The Annual Meeting was held on July 10th. Delegates were appointed to represent the Branch on the Chandos Crop Competition Committee. Officers were elected for the ensuing year. (Secretary, Mr. W. Pearce.)

**COPEVILLE** (Average annual rainfall, 11.58in.).

Mr. J. Collins presided over an attendance of 11 members and a large number of visitors at the meeting held on July 9th, when Mr. C. McKenna, B.V.Sc., M.R.C.V.S. (Government Veterinary Officer), delivered an address, "Common Ailments of Farm Stock." (Secretary, Mr. G. Sutherland.)

**COOMANDOOK** (Average annual rainfall, 17.45in.).

Annual Meeting held July 25th. Present: Mr. F. Ballard (Chair) and nine members and two visitors. The annual report was read and officers elected. (Secretary, Mr. W. Trestrail.)

**KALYAN.**

Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Wheat Diseases," at the meeting held on July 15th. (Secretary, Mr. V. Luhrs.)

**KANNI.**

Meeting held July 12th. Present: 18 members. The annual report was read and officers elected for the ensuing year. A programme of meetings was also arranged. (Secretary, Mr. F. Woodhead, Waikerie.)

**KI KI.**

The meeting held on July 23rd was attended by the Chairman, Mr. W. Goodall, 10 members, and several visitors. Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Suitable Wheats for the District." (Secretary, Mr. P. Crowhurst.)



**MARAMA.**

The Annual Meeting was held on July 21st, and was attended by 14 members and visitors. The annual report was presented by the Secretary, Mr. T. Hinkley, and officers elected for the ensuing year.

**MERIBAH** (Average annual rainfall, 11.70in.).

Mr. W. Mason presided over an attendance of 23 members at the meeting held on July 14th when Mr. E. L. Griffiths (District Agricultural Instructor) delivered an address, 'Fallowing and Cultivation.' (Secretary, Mr. E. Carr.)

**MILLENDILLA** (Average annual rainfall, 13in.).

Eight members and several visitors were present at the Annual Meeting, which was held on July 17th. The Secretary, Mr. V. Wegener, read the annual report, and the election of officers took place.

**MONARTO SOUTH** (Average annual rainfall, 14in. to 15in.).

July 19th.—Present: 30 members.

**CROP ROTATION.**—The following paper was read by Mr. H. Kempe:—"It is possible to grow wheat on the same land every year. This practice is adopted for a few seasons when a farmer is taking up virgin country to assist him to obtain as much as possible from his land. This state of affairs, however, cannot continue for any length of time. It is claimed, for instance, if a cow be left in a clover field, having nothing else to eat but clover, the time will quickly come when she will sicken of this food. The same may, in a measure, be applied to a plant. The following are the advantages of a good rotation:—It Conserves Plant Food.—The toxins produced by one plant in many cases are an advantage to another plant. This is readily seen where one crop stimulates one kind of weed to grow beside it; the residue left by one plant becomes food for another. It Economises Manure.—Some crops require more of one constituent, e.g., potatoes require much potash and cereals little, so that by interposing potatoes between cereals a better use can be made of the potash in the soil. Again some crops are deeper rooted draw supplies from the subsoil, e.g., wheat or rape, while others are shallow, e.g. barley or turnips. Thus in a rotation all layers of the soil are brought into active commission. It Conserves Moisture.—By rotating some crops require more cultivation than others, and it is an acknowledged fact that cultivation is the secret of dry farming. Water is also conserved when the rotation includes a well-cultivated bare fallow. It Improves Cultivation.—Many crops give opportunity for intertillage of the soil. It Restores Humus.—The humus in the soil can be replenished by the growth of forage crops, which may either be ploughed in as green manure or consumed on the land by stock. Nothing can compensate for the absence of humus, and by introducing green crops into a rotation whose main object is the production of wheat, the yields of wheat may be largely increased. Humus is the decaying vegetable matter of soils, and is replenished by the addition of crop residues or stable manure. Humus, when decayed, eventually forms nitrates, which are essential to successful cropping. The oxidation or decaying process of humus is brought about by various kinds of bacteria and free access of air. In damp soils, in the absence of air, the bacteria cannot complete the process of decomposition, with the result that 'humid acids' are formed, rendering the soil sour. In such cases lime is useful, because it stimulates the bacteria that decompose the humus. Generally speaking, the more pervious to air a soil is, such as sand, the more rapidly will the humus be changed into nitrates, and the more frequently will the humus require renewing. It Replenishes Nitrogen.—Leguminous crops can be grown at some place in the rotation, and thus a store of nitrogen is laid up in the soil for the use of future crops. It Eradicates Weeds.—Weeds are kept down when the rotation contains bare fallow or a crop grown in wide drills, permitting intertillage, thus keeping down weeds. Checks Disease.—Oats, for instance, are not affected by take-all, neither are peas, trefoil, or clover. As this fungus cannot live without food, a suitable rotation will help considerably to check this disease. It permits of keeping livestock. It Distributes Labor.—Different crops have different seasons of sowing and harvesting. On a one-crop farm, however, certain seasons are too slack, whilst others are too busy. Where constant labor cannot be found the hired help obtained at the busy season is often not satisfactory. It Tends to Decrease Market Fluctuations.—A rotation of crops gives a variety of produce, and in a bad year for the selling of wheat it is possible that the market for wool, mutton, dairy produce, &c., may be better, thus keeping up the gross receipts. To select the particular rotation which is suited to his locality is a very important task which falls to the lot of the farmer. In dry districts special attention should be given to fallowing and the conservation of soil moisture, and in planning a rotation this fact should be constantly kept in view. Following examples of rotation might be suggested



for practice in dry districts:—A—Wheat—pasture—bare fallow; B—Wheat—bare fallow—rape (or any other forage crop, such as peas, &c.)—bare fallow. This rotation would permit of the carrying of much larger flocks. For a rainfall of from 15in. to 20in. one fallow would probably do for every two crops, and the following rotation could be adopted:—A—Wheat—rape—bare fallow; B—Wheat—bare fallow—rape. Here again in place of rape some other forage crop could be chosen." Discussing the paper members were of opinion that oats should be substituted, for conditions were too dry for the latter crop in the Monarto district. (Secretary, Mr. C. F. Altmann.)

#### MOOROOK.

The Secretary of the Branch, Mr. E. Liddicoat, reports that meetings of the Branch have been held as follows:—June 5th, Mr. H. Berriman (District Horticultural Instructor) gave a pruning demonstration. On June 10th the local pruning competitions were held. Mr. F. Petch gave an address, "Ailments of Stock," at the meeting held on July 22nd, which was attended by 14 members. On August 14th Messrs. H. B. Barlow and P. H. Suter, of the Dairy Branch of the Department of Agriculture, addressed a gathering of 24 members and visitors on the subject, "Keeping Cows on an Irrigated Fruit Block."

#### NETHERTON.

Twenty-two members attended the meeting held on July 9th. The following papers were read and discussed:—"Farming with the Tractor," Mr. W. Merritt; and "Farming with Horses," Mr. A. Ritchie. (Secretary, Mr. C. Wilkin, Yumali.)

#### NUNKERI.

Business of a formal nature was transacted at the meeting held on July 9th, which was attended by Mr. R. Elliot (Chair) and 12 members. (Secretary, Mr. F. Ling.)

#### OVERLAND CORNER (Average annual rainfall, 10.58in.).

Mr. T. Atkinson presided over an attendance of 17 members at the annual meeting held at Mr. J. Loffler's residence on July 8th. The annual report was read and officers elected. A programme of meetings was arranged. (Secretary, Mr. H. A. Loffler, "Wirrelyerna," via Morgan.)

#### PARILLA WOMEN'S (Average annual rainfall, 14.15in.).

July 29th.—Present: 17 members.

UTILISING OLD WOOLLEN DRESSES.—Mrs. P. Rice read the following paper:—"A good way of making use of old woollen costumes, cardigans, jumpers, &c., is to cut them up for children's clothes. The chief point in making these up is to avoid much handling of the material once the article has been cut out, as ravelling of the wool happens very easily. To avoid this, outline with a machine right around the pattern before cutting it out, but this is not absolutely necessary provided the making up of the article is proceeded with as soon as possible after cutting out. Place the pattern on the material (which has previously been washed, then unpicked, and pressed), but do not stretch or pull it whilst cutting out, as it is easily pulled out of shape. If the original article has stripes or pattern, these can be so applied that they appear suitably on the little garment. Wherever possible, use the ribbed cuffs and bottoms of jumpers for the sleeves and the bottom of small jumper or dress, but if these parts are too worn to be used again, a very effective binding for edges is military braid, which can be had in all colors to tone, and is quite easy to apply. Any buttons may be covered with pieces of the material, and the whole cost of the small garment need not exceed that of a few press studs and braid. Bloomers and knickers have elastic in knees and waist, and to complete the outfit, a cap of the material is easily made of the odd pieces. The lower part of worn singlets can be used in the same manner for small singlets, merely by stitching up the side seams and crocheting an edging round the neck opening and arm holes."

CHILDREN'S FEEDERS.—Mrs. J. Ferguson gave the following directions for making children's feeders:—"Purchase some shelving oilcloth, cut out the feeders, and bind with bias binding. The feeders can be washed after each meal. For a table mat to place in front of the child, a piece of bound white table oilcloth saves spots on the tablecloth. If these hints are put into practice a good deal of washing will be saved."

DRESSMAKING HINTS FOR HOME WORKERS.—Mrs. G. Beckman read the following paper:—"When cutting out long, close-fitting sleeves from plain materials, it is often difficult to get it narrow enough to be really smart without being uncomfortable, tight, and apt to burst at the seams. To overcome this, cut the sleeves on the bias instead of the straight of the material. Cut in this way, it is the material and not the seam that



'gives' to any muscular exertion. The material will resume its shape when the strain is released, whereas the seam will not do this. *Method of Facing Skirts, &c.*—There are often occasions when it is necessary to face the lower edge of a skirt. For instance, if a skirt is made of tweed, a great deal of bulkiness is avoided if the lower edge is faced with a piece of lining or silk, cut on the cross. Cut the lining or silk on the cross, making it about 3½ in. wide, join it, then press the seams well. Turn in the edges of facing piece, and press. Place the skirt on the table, and tack on the facing; then slipstitch and press well. Facings should be cut, according to the shape of the edge to be finished. For straight edges, cut the facing on the straight of material, and if a shaped piece needs to be faced, either cut the facing the same shape or on the cross. For flared skirts, the facing should always be on the cross. When making flared dresses or skirts, it is advisable to hang on a dresshanger for a few days, when there will be no trouble in hemming up the skirt evenly. *A Pillowcase-making Hint.*—When making pillowcases, it is a good plan to purchase circular pillow cotton, i.e., there is no seam in the side of the case when made. Cut the material the length required, allowing about 1½ in. each end for a hem. Then cut eight lengths of tape, 7 in. long and 1½ in. wide. Fold in the material three lengthways, and make a crease, or mark with a tracing-wheel, where tapes are to be placed. Next, crease the ends of the case ready for the hem. Have the tapes ready, and insert them when stitching the hems. The idea for the hem on each end is that the pillowcases may be turned, so that four portions of the case get the wear instead of two. There is a saving of time in making, also in washing, as there are no corners to collect dust or feathers from the pillows. (Secretary, Mrs. Burford.)

#### PARUNA.

July 11th.—Present: 14 members.

**CONTROL OF SAND.**—In the course of an address on this subject, Mr. E. Edwards advised following the sand hills as early as possible in July, then sow them down with about 20 lbs. of oats and a dressing of 35 lbs. to 40 lbs. of super per acre. When the oats were well established, graze lightly for the first time, then as the plants became stronger they could be grazed a little heavier; after a while the sheep could be left on them. The ground would be well packed and contain all the roots and hold the sand from drifting. If the whole of the paddock was of a sandy nature, Mr. Edwards said it would pay to treat the whole area the same. By this method one not only held the sand in its place, but also provided good feed for many more sheep.

**VEGETABLE GARDEN ON THE FARM.**—Paper read by Mr. J. Altmann. Every farm should have a garden in which to grow vegetables for home use. Choose a piece of ground which is sheltered from the west and south winds or make a break around to prevent the wind from damaging and breaking the young plants. A good dressing of well-rotted stable manure should be applied, dug in and left rough for a week or two; then a light sprinkling of slack lime raked in, and the plot would be ready for planting. Choose the right kinds and plant them at the right time. In planting cabbage and cauliflower choose the strongest plants and set them out at least 2 ft. apart each way. A few of the leading kinds that do well in this district are Burpee (they grow quickly and have large heads); Henderson's Succession does as well, and heads all the year round. Cauliflowers.—Green Leaf and Yates' Main Crop are the two best for this district. Cabbage and cauliflowers should not be forced too much from the start. Water frequently for the first few days, then two waterings a week for a couple of

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weeks. Later, a good flooding every week. Hoe between the plants a day after each watering when the plants begin to form heads, then they can be forced to grow quickly by using blood manure, sulphate of ammonia, and liquid manure. Tomatoes are one of the best crops for summer. The plot should be prepared in July by digging a trench 2ft. 6in. to 3ft. wide and 18in. deep. Give the soil a good layer of pig manure, cover it up and see that it is well trodden down. Apply a layer of well-rotted stable manure, cover it up, and leave it till planting time. Space the plants 2ft. 6in. apart. Leading kinds for this district are Matchless, American Coreless, Earliana, and Early Jewel. All are heavy croppers and do well if watered sufficiently until they flower, then leave off to allow the fruit to set. When fruit has set, water heavily and give liquid manure to obtain good-quality fruit. Peas should also be planted in July. The best kinds are William Hurst, Te Aroha, and Little Jim. Te Aroha is a very heavy cropper, with large pods. Peas should not be put in when fresh stable manure has been dug in; they do better without. Root vegetables, such as carrots, parsnips, turnips, and beet should be planted from March to May.

A meeting was also held on June 20th when an address dealing with the subjects, "Mixed Farming" and "Wheat Varieties" was delivered by Mr. W. J. Spafford (Deputy Director of Agriculture). Twenty-nine members and three visitors attended. (Secretary, Mr. F. Sumner.)

#### PARRAKIE (Average annual rainfall, 14.51in.).

The meeting held on July 11th was attended by 22 members and 16 visitors, when Mr. Kirkwood, manager of the Lameroo branch of the Bank of Adelaide, delivered an address, "Farm Finance." With the aid of a blackboard, the speaker illustrated a method of bookkeeping on the farm. (Secretary, Mr. W. Watts.)

#### REMARK (Average annual rainfall, 10.93in.).

Meeting held July 31st. The Chairman (Mr. O. Weste) presided over a good attendance of members and visitors. The annual report was presented and officers elected. Mr. E. Seary gave an address, "A Review of the Dried Fruit Industry." Mr. H. Howie also spoke. (Secretary, Mr. W. Meier.)

### SOUTH AND HILLS DISTRICT.

#### BLACKWOOD (Average annual rainfall, 27in. to 29in.).

After the annual report had been presented and officers elected, Dr. J. Davidson, D.Sc., Entomologist at the Waite Research Institute, delivered an address. "The Life History of *Aphelinus Malt.*" Twelve members and 13 visitors, including members from the Clarendon and Cherry Gardens Branches, attended. (Secretary, Mr. R. Quinn.)

#### CURRENCY CREEK.

The Annual Meeting was held on July 14th, and was attended by 13 members and visitors. The annual report was presented by the Secretary, Mr. D. Gordon, and officers elected for the ensuing year.

#### INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

Mr. A. Fuller (Chairman) presided over an attendance of 15 members and a large number of visitors, including members from the Port Elliot Branch, at the Annual Meeting held on July 10th. The annual report and balance-sheet were presented. Mr. H. C. Pritchard (General Secretary Agricultural Bureau) addressed the meeting. (Secretary, Mr. H. Lewis.)

#### IRONBANK (Average annual rainfall, 33in. to 34in.).

July 23rd.

Members and visitors from Blackwood and Cudlee Creek met at Mr. Geo. Pole's orchard to inspect some apple trees which had borne a fine crop of fruit. Different methods of pruning and their effects upon the trees were discussed, and one member from each district represented pruned a tree which will be kept under observation. Afternoon tea was provided by the Ladies Guild. (Secretary, Mr. C. Morgan.)

#### KANGARILLA.

Nine members and several visitors attended the annual meeting, which was held on August 5th. The Secretary, Mr. T. Golder, presented the annual report, and officers were elected for the ensuing 12 months.

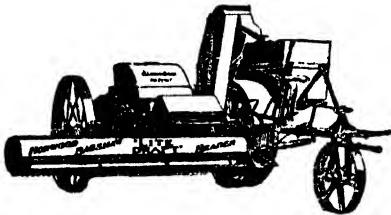


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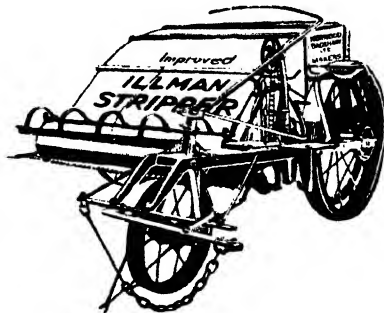


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#### LANGHORNE'S CREEK (Average annual rainfall, 14.84in.).

March 12th.—Present: 33 members and six visitors.

Mr. E. Laurie, of the Irrigation and Drainage Commission, gave a lecture, "On the Conservation and Use."

Meeting held May 5th. Present: 24 members and visitors. Mr. Geo. Quinn (Horticultural Instructor) addressed the meeting on the subject, "Citrus Culture."

Eighteen members attended the meeting held on June 11th, when Mr. A. H. R.D.A., read a paper, "The Currant."

The Annual Meeting was held on July 9th, there being present 20 members and four visitors. After the election of officers the meeting took the form of a discussion. Messrs. J. Natt and M. Cleggett spoke in favor of dual-purpose cattle whilst the breeds were supported by Messrs. J. Bray and N. Wetherill.

A successful social and dance was held on July 22nd. Delegates from neighboring branches attended. (Secretary, Mr. H. Follett.)

#### LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 36in.).

July 28th.—Present: 12 members.

MARKETING PRODUCE.—The meeting took the form of a debate on the subject, "Should Growers Market Their Own Produce?" Mr. J. Vickers, opening the debate for the affirmative, said that since time immemorial the market place had been the centre of exchange of primary produce. Market day had been looked upon as the day of the week when everybody was in town, and that mode of marketing was still in vogue to this day because it contained advantages which could not be had by any other method. Marketing one's own produce the personal touch was acquired between the grower and the buyer, and buyers as a rule preferred that, as they were surer of what they were buying. Co-operative methods and concerns had from time to time been started, but he considered that costs in general, especially labor, were too high in Australia for that form of marketing. When the marketing was left more to the grower he could do it more cheaply than when left to others who had little or no interest in making things. He thought their produce was not adaptable for auction marketing, as there were many different grades, sizes, &c., which could not be judged by the appearance of the top. Supply and demand ruled every market, and the present practice was the method of allowing the farmer to operate. Mr. W. J. Bishop took the opposing side. He said the present system was entirely out of date. He spoke against auction marketing because of the danger of collusion, and that would mean that goods would go for the lowest bid. He suggested a scheme of selling through commission agents and keeping it co-operative. By that means a trained salesman would be selling instead of gardeners who often knew little of the ethics of salesmanship. It would mean that pressure would be necessary to get the growers to act unanimously, when they could sell through an organized channel, demand a price instead of the buyer as at present quoting. Other members also spoke, and considered that the proposed scheme was worth consideration. (Secretary, Mr. B. Lawrence, Lenswood.)

#### LONGWOOD (Average annual rainfall, 37in. to 38in.).

The meeting of August 9th was held at the residence of Mr. R. Lewis. Mr. W. H. presided over an attendance of seven members. The party was afforded the opportunity of inspecting the orchard, and a review was made of the fruit trees prior to pruning. (Secretary, Mr. J. R. Coles.)

#### McLAREN FLAT.

The annual social, held on July 24th, was well attended. Prizes won at the Pruning Competitions were distributed. A presentation was made by the members to the retiring Secretary, Mr. C. Robertson. A musical programme and dancing concluded the evening. (Secretary, Mr. A. Bruce.)

#### MILANG (Average annual rainfall, 15.13in.).

Meeting held July 9th. Present: 14 members. A paper, "The Farm Garden," presented by Mr. W. Yelland, and a keen discussion followed. (Secretary, J. P. Bagley.)

#### MOUNT BARKER (Average annual rainfall, 31.66in.).

The Annual Meeting was held on August 6th, when officers were elected for the ensuing year.

On September 10th Mr. A. Hilton, B.Sc., of the Murray Bridge High School, gave the address, "Agricultural Education in America."



Mount Barker Branch was held on October 1st, 1900. A large number of members and visitors, accompanied by the Secretary of the Department of Agriculture, first visited the station, where Mr. H. Trumble, of the Waite Experiment Station, was being given to various pastures. The Secretary of the Mount Barker Branch, Mr. J. H. Pope, then visited the factory. The dairy herd of Mr. P. Pope was then shown, and a demonstration of the points of a good dairy cow was given. The Illawarra dairy cattle which had been sent to Mount Barker by Mr. Howard.

### MOUNT COMPASS.

Present: 30 members and visitors. Mr. H. Peters gave a presentation on milk testing. Mr. C. Vercò gave a resume of the proceedings of the Iaren Flat Annual Social. Interesting data on pig fattening tests conducted by Mr. Peters were submitted by Mr. A. Peters. (Secretary, Mr. J. Black.)

**NARRUNG** (Average annual rainfall, 17in. to 18in.).

J. McNicol presided over an excellent attendance of members and visitors at the annual meeting which was held on July 26th. A report of the year's work was read by the secretary, Mr. W. Lawrie, and officers were elected for the ensuing 12 months.

PORT ELLIOT (Average annual rainfall, 20.05in.).

August. 19th.—Present: 19 members.

**QUESTION BOX.**—The meeting took the form of a "Question Box." Mr. J. Crompton 1, "When should a calf be taken from the cow." Opinion varied on this matter, 1rs. Parsons, Brown, White, and James saying that it must not be left more than 1ours. The Chairman said he thought there was a danger of milk fever if taken 1 too soon. Mr. Hay thought three or four days. Mr. J. Colebatch asked, "Is it 1advantage to add salt to pigs' feed, and if so, what quantity per day. Several 1bers spoke, and expressed the opinion that salt was dangerous to give to pigs. 1retary, Mr. B. A. Lowe, c/o Messrs. Jacobs & Russell, Adelaide.)

## RAPID BAY.

August 14th.—Present: 12 members.

SPORT AND RECREATION.—In reading a paper on this subject, Mr. R. Walsh said one of the reasons for the desire of young people to forsake country life for the city was on a farm the farmer employed a few extra hands during busy seasons and, when slackened off, the laborers were dismissed and found it difficult to get another job. He did not encourage a young man to look for work on a farm when the city was able to offer a regular job, with shorter hours and plenty of amusements. Another fact worthy of consideration was that every one did not have a liking for farm work, and if a young man was kept at it against his inclination, would not make a successful farmer. Again, farmers did not take any interest in sport, and overlooked the fact that when a young person saw his friends going to some form of amusement on a Saturday afternoon he was not permitted to join them, it was likely to make him discontented. There was a noticeable desire on the part of many farmers to make sufficient money as quickly as possible so that they could retire and live in the city. Whatever justification there might have been for that in years past, to-day with all the modern appliances and conveniences by which a farmer could equip his home, to render the work both outside and in less arduous and irksome, the same arguments could not now be used to give up life in the country areas. A happy and contented home was worth more than a big bank balance. An old proverb, "That all work and no play makes Jack a dull boy," nowadays fully applied to Jill. The young people on a farm work long hours, and often at arduous work, and where no encouragement was given for recreation, the work very soon became dull and monotonous. Under such conditions is it any wonder that the young people want to get away from farm life. Where there are young people, lay down the law in their own courts for them. If the boys want to join a football club, encourage them to do so. The knocks and bumps that they receive will help to make men of them. The ideal should be to "work while you are at play and play while you are at work." (Secretary, L. Morris, Delamere.)

## SHOAL BAY.

line members and visitors attended the meeting held on August 5th. It has been decided to purchase a pure bred Jersey bull to improve the quality of the cows in the district. (Secretary, Mr. H. Bell, Wisanger.)



# CROWN

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When offered, full particulars will be published in the *Government Gazette*, and plans and detail may be obtained from the Secretary for Lands, Box 293A, Adelaide.

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## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Secretary for Lands, Adelaide.

---

## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

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## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



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a barn free of either pest. I take it that much depends on whether you make it a regular practice of storing large quantities of wheat every year or whether you have simply in view a temporary emergency. It should not be impossible to render the barn mouse-proof, but the trouble is that mice find admittance in most unexpected ways, and are therefore difficult to control in any type of barn. As for weevil, the only practical remedy that I know of is to place the grain in an air-tight vessel. In the course of time the grain develops a sufficiency of carbonic acid gas to destroy any weevil that may be present. It seems to me, therefore, that for the purpose the most effective form of storage that you could adopt would be to shoot the wheat into ordinary galvanized iron tanks of the type used for storing water, care being taken to seal down the overhead trap door hermetically. I realise, of course, that it involves a rather heavy initial expenditure, but it is the type of expenditure that would last for a life time, and would be absolutely effective against both weevil and mice. Beyond that, it is difficult for me to give you any other advice, except to make your barn as mouse-proof as you are able, and to be careful not to store wheat that is at all damp.

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[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

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#### Ensilage.

If ensilage is made in a hole on limestone ground, will the material be injuriously affected to the extent of it killing horses? (Rosedale Agricultural Bureau.) Reply—Whenever ensilage is made in a hole in the ground there is some waste through the outside and top developing mould, and the amount of waste because of this, is greater in limestone country than where the soil is more clayey in nature. This is due to the fact that limestone soils allow more air to get at the ensilage than is the case with soils of heavier texture. If horses eat the moulded part of the ensilage there is some danger of digestive troubles developing, but provided only clean, well-made ensilage is fed to the animals, horses do well on it, and the quality is just as good from a limestone pit as from the very best of silos. Because of the friable nature of limestone soils, pits must be made of the same shape as ordinary earth dams, and a good deal of batter must be given to the sides. When making ensilage in such pits, the material is spread out and each fresh load is driven right into the pit on top of what has already been spread. This driving backwards over the material consolidates it very well and helps make a much better ensilage than if no such pressure was used.

#### Fodders for Pigs.

What sort of green fodder is best for pigs, and can mangels be used for this purpose? (Rosedale Agricultural Bureau.) Reply—Pigs utilise all kinds of green feed to advantage when fed to them in conjunction with grain, and of the green fodders that can be grown in your conditions, lucerne is easily the best for these animals. Mangels are a very useful pig food, provided—(a) that they have been stored for some time before being fed to pigs, and (b) that they are fed in conjunction with grain of some kind. After mangels have been lifted from the ground they are topped and rooted, and stacked in clumps of the same shape as the heaps of broken road metal so common on our roadsides. The stacks have vent-pipes built into them, and are covered first with straw and then with earth. When stored, mangels mature and are changed from a fairly dry feed, when fresh from the soil, into a first class watery forage. If mangels are not to be stored, they should be lifted and be allowed to wilt for a few days before being fed to farm livestock, and then they should be sliced and fed in conjunction with foodstuff.



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**All communications to be addressed:**

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## AGRICULTURAL VIEWS AND COMMENTS

al Bureau Conference.

at Lower North Conference. The Lyndoch Branch (J. S. Hammat, of Williamstown, Secretary), will be held at Lyndoch on Thursday, February 11th. The members of Branches in the Conference district are requested to forward papers to the General Secretary, at the Lyndoch Conference, a fortnight prior to February 26th. The Conference will commence at 10.30 a.m.

### Empire 1934-35.—How Farmers are kept in touch with Research.—

now the Empire Marketing Board, containing the answers to all questions asked by the various Governments. An Introduction has been written by Mr. J. H. M. Stationery Office, 1s. net.).

Report outlines the methods adopted for "getting across" scientific results to men on the land in over 40 different Dominions, Colonies, Provinces, States, etc., and, states the preface, be of considerable interest in all Empire countries as a source of suggestions and a summary of experience.

Mr. Daniel Hall points out that the most effective method of diffusing information among farmers is by personal visits of instructors, experts, &c., to individual farms. The best appears to be visits of the farmer to demonstration farms and experimental stations. The less intimate the personal contacts, the less effective the education will be. Lectures, broadcasting, films, bulletins, and journals all suffer from this disability. Our own experience, which is paralleled by the Bureau system of South Australia, shows that meetings for discussion provide a greater stimulus than the pure lecture, even though the latter are more numerous.

broadcasts, films, bulletins, "better farming" trains, and other methods are a development of the demonstration train idea which is described is a one which is attached a van containing the exhibits. The instructor tours about visiting at farms and giving lectures and demonstrations with his van in the country. This method has not yet been tried in the Empire.

**Received.**

ary acknowledges the receipt of the following publications:—

English Plough," by J. B. Passmore, M.Sc. Published by The Oxford Press, London. Price, 7s. 6d.

Dissemination of Research Results Among Agricultural Producers." Empire  
Board, No. 33. Price, 1s.

of 1929 of the Colorado (U.S.A.) Agricultural Experimental Station.

d for Empire Butter," E.M.B. Report No. 34. Price, 1s. net.

'Infectious Necrotic Hepatitis) of Sheep in Australia,' by A. W. and I.R. Bulletin No. 46.

## RICULTURAL INQUIRIES.

A. J. PERKINS, Director of Agriculture.]

bags of wheat?" (A.J.M., Wood-  
 nice on the one



**Feeding Value of Oats.**

The difference, if any, of the food value in these oats—Lachlan, Algerian, Early Burt, Mortgage Lifter? (Scott's Bottom Agricultural Bureau.) Reply—As far as we know, Algerian and Mortgage Lifter are one and the same variety of oats, and even if not so they are so very similar in every way that they can be grouped together. The analyses and feeding value of the three oat varieties are as follows:—

*Crude Nutrients.*

|                         | Early Burt. | Lachlan. | Algerian. |
|-------------------------|-------------|----------|-----------|
|                         | %           | %        | %         |
| Water .. . . .          | 13.3        | 13.3     | 13.3      |
| Ash .. . . .            | 3.4         | 2.9      | 3.4       |
| Protein .. . . .        | 8.3         | 8.4      | 9.4       |
| Fat .. . . .            | 7.0         | 4.4      | 4.8       |
| Carbo-hydrates .. . . . | 57.2        | 59.3     | 56.7      |
| Fibre .. . . .          | 10.8        | 11.7     | 12.4      |


*Digestible Nutrients.*

|                            | Early Burt. | Lachlan. | Algerian. |
|----------------------------|-------------|----------|-----------|
|                            | %           | %        | %         |
| Protein .. . . .           | 6.3         | 6.4      | 7.1       |
| Fat .. . . .               | 5.6         | 3.5      | 3.8       |
| Carbo-hydrates .. . . .    | 43.5        | 45.0     | 43.1      |
| Fibre .. . . .             | 3.0         | 3.3      | 3.5       |
| Starch equivalent .. . . . | 61.1        | 58.7     | 58.3      |

When foodstuffs of the same type are to be used a calculation of their starch equivalent values allows us to compare them one with the other. For the oat varieties shown above, it can be seen that the starch equivalent values are—

|                     |      |
|---------------------|------|
| Early Burt .. . . . | %    |
| Lachlan .. . . .    | 61.1 |
| Algerian .. . . .   | 58.7 |
|                     | 58.3 |

These figures show that Algerian and Lachlan are of equal feeding value, and Early Burt is a little superior to the others.



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## HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. G. QUINN, Chief Horticultural Instructor.]

### Cincturing the Currant Vine.

Can you advise me of the early history of the introduction of cincturing the currant vine, and the correct method of doing the work? (P. H. Q., Clare.) Reply—The practice—which is age old in Greece—was introduced here by the late W. C. Grasby, when Editor of the *Garden and Field*, who visited Greece about the latter end of the nineties of last century. The accepted practice is to remove a very narrow ring of bark— $1/12$ th of an inch wide is enough—right into the sapwood layer. It is done with the best effect when the corollas—green star-shaped caps—are falling from the flowers very freely. The action on the plant is a temporary check to the returning elaborated sap, owing to the part severance and exposure to the air of the sap vessels through which this descends. The crude sap ascends to the leaves through vessels more deeply situated, and, consequently, that stream is not seriously interfered with by the operation. The narrow cincture is soon filled across with new callus cells, and the normal ascent and descent is gradually restored. In the meantime, the berries become knitted, as it were, to their pedicels, and adhere firmly when growth is resumed.

### Non-setting of Almonds.

A member of the Smoky Bay Branch has several almond trees, and the blossoms fall off instead of setting fruit. Reply—There are several causes, either of which may account for this defect. (1) If the almond trees bloom in the frosty or cold and wet period of the year in this State—usually at the end of July and early August—the climatic effects may clog the pollen or damage the flowers, as well as inhibit the activities of pollen carrying insects. The Brandis variety is seriously influenced in these directions. (2) If only one variety is grown, the blossoms may be self sterile, or if more sorts are grown but only one sort blooms at a time, the same effect operates. (3) The planting of sorts known to bloom simultaneously is a safeguard, and more particularly if they be from mid-season to late in their periods of blossoming. Amongst soft-shelled kinds the following are recommended for inter-pollination:—Ne Plus Ultra for I.X.L.; Ne Plus Ultra for Harriott's Seedling; I.X.L., Hatch's Nonpareil, and Jordan for Ne Plus Ultra.

## DAIRYING INQUIRIES.

[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor.]

### Feeding Calves for Market.

“What is the best ration on which to fatten calves for market? Would either skim milk and pollard or crushed wheat and milk be suitable?” A.A.L., Gladstone. Reply—Skim milk and pollard makes quite a good ration for calves, but if a little linseed meal or gruel made from linseed meal is added, a better fattening ration could be made up. When using linseed meal, I suggest slowly boiling about 1lb. of linseed meal in about 3galls. of water and then feeding each calf about half a pint of the resultant gruel in its skim milk. With young calves, add the linseed gruel in small amounts to commence with and gradually increase the amount as the calf gets older. After the calves are about three weeks to one month old, it is advisable to make available some chaff and crushed grain for them to eat during the day. The grain mixture can be made up of any grains available, i.e., oats, barley, or wheat, or a mixture of each. Some people prefer adding a little bran, but if grain is available this is not necessary. It is better to feed the grain mixture in a dry state in preference to mixing it with the



milk. The main point in fattening calves for the market is to keep them in good health, and to obtain the best results they should be fed their milk ration regularly, and at approximately the same temperature each day (about 90 deg. F.), and all buckets, etc., should be kept clean and free from any sourness.

### VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

A member of the Coonawarra Branch of the Agricultural Bureau has a cow due to calve in three weeks, the animal is still in full milk and cannot be dried off. Reply—It is highly desirable that all cows should have a rest period of from four to six weeks before calving in order that the calf may be amply nourished and born strong, and also to allow the cow to recuperate from the drain on her system, which is heavy when she is producing a lot of milk. The cow will not be dried if she is kept on green pasture or concentrates. The following routine is suggested:—Withhold all concentrates and green feed, and only feed on roughage, such as hay with very little grain in it. Do not milk the cow out completely, but leave a little milk in the vessel, and gradually reduce to milking once a day, and then once in two days, &c. Give one tablespoonful of alum dissolved in water twice a day for three or four days. The fact that the cow continues to lactate is not, in the true sense of the word, serious, but a rest period is advisable. When she calves, be on the look out for symptoms of milk fever, which often occurs in deep milking cows.

“E. H. R.,” Wudinna, asks cause of horse stamping feet before passing water. Reply—Wash out the sheath with warm water and soap, and subsequently smear with olive oil. If horse is in poor condition, it should be starved for 18 hours and subsequently given the following drench:—Raw linseed oil, 1½ pints; turpentine, 4 tablespoonfuls. Shake thoroughly before giving.

“D. F.,” Kyancutta, asks treatment for sheep that have become foundered due to grazing on wheat crop. Reply—The treatment is as follows:—Give following drench at once:—Bicarbonate of soda, two heaped tablespoonfuls dissolved in half a pint of water. Two hours later drench with raw linseed oil (½ pint) in which is mixed 10 drops of turpentine. Take sheep off wheat crop. Starve for three to four days. Allow plenty of water and a little straw. Treatment, to be satisfactory, must be adopted early.

“L. E. T.,” Bowhill, asks—(1) cure for warts on cow's teats, and (2) treatment for cow which did not pass the afterbirth until 11 days after calving? Replies—(1) Warts on teats can often be removed by washing the teats after each milking in

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warm water containing a little washing soda, and then, after drying them, rubbing in a little castor or olive oil. The application of salicylic acid 1 part, collodion 7 parts, to the teats for a few days will also serve to remove them. Failing success with either of these remedies, snip off any warts with necks and touch the stumps with caustic pencil (though if they are large it would perhaps be safer to remove them by tying a ligature of silk or fine waxed thread round them). The caustic pencil can also be used to touch flat warts after washing them first in the washing soda solution and drying, but care must be taken that the caustic is applied only to the warts and not to any of the adjacent healthy skin. (2) Where retention of the afterbirth occurs after calving, steps should be taken to remove it manually long before the lapse of such a long period, otherwise the cow is very likely to get a septic metritis, which, if it does not kill her, will render her useless for further breeding purposes.

"E. M. E.," Paruna, reports aged mare with swelling on brisket extending forward between front legs, scouring badly, and off food? Reply—The following treatment is suggested:—(1) Give following powder daily for seven days—mix in small damped feed: Pulv. arsenic, 5 grains; antim. pot. tart., 1 dram; ferri sulph., 4 drams. (2) Feed on boiled oats or boiled linseed mixed in small feed of bran and chaff. Supply a little green lucerne, if available. (3) If animal will not eat, give a heaped teaspoonful of powdered nux vomica night and morning for a few days. Mix with treacle and smear on tongue.

"A. E. T.," Crystal Brook, has cow, after being fed on rusty and damp hay, is dull and listless, loss of appetite, and has lost condition. Reply—A thorough purgative action is desirable, and the following treatment is recommended:—Take Glaubers salts,  $\frac{1}{2}$  lb.; Epsom salts, 1 lb.; powdered ammonium carbonate, 1 oz.; ginger, 2 ozs.; treacle, 1 lb.; water, 2 pints. Directions—dissolve the salts in a pint of hot water, add the ammonium carbonate, ginger, and treacle, and another pint of water. Give when cool. Allow the animal plenty of water to drink. Follow with powdered nux vomica twice a day for 10 days. Dose—1 teaspoonful in treacle, or mixed in a little bran. If possible, give green lucerne and a little scalded oats.

"F. L. J.," Yandiah, reports horse with a skin disease on shoulders and neck. Reply—Try the following dressing, which should be applied after washing the affected parts with soft soap and warm water. Repeat dressing every three days for three weeks:—Take flowers of sulphur, 4 ozs.; oil of creosote, 1 oz.; olive or raw linseed oil, 1 pint. Mix and make lotion. Directions—Rub in gently as directed.

"W. A. W.," Lyrup, has cow which, although calved four days ago, has not given any milk. Front quarters of udder very hard. Reply—The condition is very probably a chronic mammitis (inflammation of the udder). It is doubtful whether treatment will be successful. The following measures can be tried:—(1) Apply hot packs to affected quarters three or four times daily. (2) After each fomentation, dry and massage gently with warm camphorated oil. (3) Strip out as often as possible during the day. (4) Keep the animal isolated.

"E. J. McL.," Caliph, reports mare with apparent weakness in bladder. When trotting or moving urine is passed, and the animal cannot raise its tail. Reply—The mare is suffering from paralysis, very possibly due to an injury of the posterior part of the spine. If the condition has been there some time and is getting worse, the chances of recovery are remote. Otherwise, put the animal out of work for three to four months. The spine could be well rubbed occasionally with a good stimulating liniment, which can be obtained from the local chemist.

The Meadows Branch reports, "heifers continually chewing pieces of stick and bark." Reply—This habit is probably due to a want of mineral matter in the feed. It is suggested that the following lick is made available for the young stock:—Sterilized sweet ground bone meal, 2 parts; coarse salt, 1 part. Put out in troughs near watering places. To make it more palatable, add a little linseed meal and crushed oats. A quantity sufficient for three to four days only should be put out at a time.





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## THE WORLD POSITION OF WHEAT.

[Address by Professor A. J. Perkins, Director of Agriculture, delivered at the Forty-first Annual Congress of the Agricultural Bureau.]

### INTRODUCTORY.

"World Wheat Production: Where and When Produced," was the subject matter suggested by the Jamestown Branch of the Agricultural Bureau for an address I had been asked to deliver to its members. I must confess that at the outset I had difficulty in discovering relevant items that might reasonably and usefully be dragged within an ambit apparently so limiting. But when, on reflection, I decided that the motive behind the suggested title was in all probability the recent calamitous fall in the price of Wheat, coupled with the natural anxiety of an important Wheat-growing district as to what the future might hold in store, my embarrassment took on another shape, and I found myself wondering how much matter I dare include in my address without running the risk of wearying my audience. And to-night I must leave it to an audience of wider interests to decide whether I have succeeded in keeping the balance even between "too much" and "too little."

### THE COMMONWEALTH'S RELATIONSHIP TO WHEAT.

I take it for granted that we all recognise that apart from occasional malign influence of speculators, the price of Wheat, like that of all other commodities, is regulated by the Law of Supply and Demand; that is to say, that it rises or falls, according as one or the other is in the ascendant. I shall have occasion to show later on that the main World demand for Wheat comes from the thickly populated Continent of Europe, and that as in Europe, Great Britain is the principal importer and London the chief port of Great Britain, local prices of Wheat are usually determined by what is known as London "parity," that is to say, on prices offering from time to time in London, less costs of delivery from ports of export. These costs from Port Adelaide are represented at the present time by approximately 8d. per bushel. This, I am afraid, is cold comfort for us who neither as individuals nor as a community are of sufficient consequence to influence the market in one direction or another. And yet we have undoubtedly owed the rapid development of our farming areas almost exclusively to Wheat; and it may safely be added that our future progress as a community will very largely depend upon our ability still further to extend our Wheat fields and generally increase the mean production therefrom. Indeed, so great is the influence of Wheat on the stability of the community deemed to be that quite recently the Prime Minister made a special appeal to farmers of the Commonwealth to place maximum areas under Wheat, and supported his appeal by the introduction of Federal legislation guaranteeing a minimum price of 4s. a bushel at railway sidings, subject to certain conditions. But, on the other hand, we learn that American farmers have been strongly urged to reduce their Wheat sowings to the extent of at least 10 per cent. Clearly we have here the results of conflicting viewpoints, each of which can probably be justified on the incidence of local environment. The United States happens to be a country dependent upon its rural industries to a minor degree only, but in which farmers have available for exploitation a vast territory open to widely diversified types of farming; they have, too, the inestimable advantage of a home market represented by over 120 million people. Hence, whilst it would apparently be much to the advantage of United States' farmers if their local Wheat production could be reduced to bare requirements of this huge home market, it is difficult to see how a reduction of 10 per cent., which would still leave an exportable surplus of 100 million bushels, could benefit them to any appreciable extent. Indeed,



towards an end of this kind a reduction of quite 20 per cent. would be requisite. Australia, on the other hand, is completely dependent upon rural production for its livelihood. It is, too, a young country, still in the throes of development; nor can it afford to mark time; and finally, apart from grazing, for its development it is more or less tied down to a single type of land exploitation, involving wheat as the major item. It follows, therefore, that however great future competition of others may prove to be, it is with us a matter of national necessity that for many years to come we should continue to produce Wheat in regularly increasing quantities. It is true that in the struggle for World Markets that must necessarily follow the local farmer will at times be heavily hit; and in common fairness the man who is fighting the Commonwealth's battles should not be left to do so single-handed, and in some instances with one hand tied behind his back. The Prime Minister has indicated one way of equalising matters in this direction; but it is very far from being the only one open to our ruling powers. There are such matters as the general incidence of taxation, high cost of living, duties on plant and material essential to the production of Wheat, freights, harbor dues, good roads, &c., all matters which to-day burden the cost of Production of Wheat and its conveyance to market, and all of which admit of adjustments that would eventually lighten the load.

#### WHEAT PRODUCTION OF THE CONTINENTS OF THE WORLD.

Let us now consider what has been within recent years the Mean World Production of Wheat, together with its distribution over the Continents of the globe. Data relating to this question have been summarised in Table I., which has been adapted and expanded from Cornell University Memoir 118 (V. P. Timoshenko).

TABLE I.—*Showing Mean Pre-War, War, and Post-War Distribution of Wheat Production throughout the World.*

|                                                                                              | Pre-War.<br>1909-13.    |                       | War.<br>1914-18.        |                       | Post-War.<br>1921-25.   |                       | Post-War.<br>1926-28.   |                       |
|----------------------------------------------------------------------------------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|-----------------------|
|                                                                                              | Millions<br>of<br>Bush. | Per-<br>cent-<br>age. | Millions<br>of<br>Bush. | Per-<br>cent-<br>age. | Millions<br>of<br>Bush. | Per-<br>cent-<br>age. | Millions<br>of<br>Bush. | Per-<br>cent-<br>age. |
| Europe .....                                                                                 | 1,963.2                 | 43.6                  | 1,560.5                 | 35.5                  | 1,532.6                 | 35.0                  | 1,970.5                 | 38.9                  |
| North and Central<br>America .....                                                           | 896.5                   | 19.9                  | 1,086.1                 | 24.7                  | 1,182.0                 | 27.0                  | 1,355.4                 | 26.7                  |
| Asia .....                                                                                   | 1,265.1                 | 28.1                  | 1,340.8                 | 30.4                  | 1,189.4                 | 27.1                  | 1,200.6                 | 23.7                  |
| South America ..                                                                             | 178.9                   | 4.0                   | 195.1                   | 4.5                   | 245.8                   | 5.6                   | 282.6                   | 5.6                   |
| Oceania .....                                                                                | 97.7                    | 2.2                   | 116.8                   | 2.6                   | 133.7                   | 3.0                   | 152.7                   | 3.0                   |
| Africa .....                                                                                 | 100.3                   | 2.2                   | 101.1                   | 2.3                   | 101.4                   | 2.3                   | 111.1                   | 2.1                   |
| World Production                                                                             | 4,501.7                 | 100.0                 | 4,400.4                 | 100.0                 | 4,384.9                 | 100.0                 | 5,072.9                 | 100.0                 |
| World Population                                                                             | 1,735,800,887           |                       | 1,706,635,448           |                       | 1,837,015,371           |                       | 1,914,058,810           |                       |
|                                                                                              | Bushels.                |                       | Bushels.                |                       | Bushels.                |                       | Bushels.                |                       |
| Wheat available per<br>head of World popu-<br>lation after deduction<br>of seed requirements | 2.41                    |                       | 2.39                    |                       | 2.22                    |                       | 2.46                    |                       |
|                                                                                              | 1913.                   |                       | 1918.                   |                       | 1925.                   |                       | 1928.                   |                       |
| Mean Export Value of<br>Wheat in Australia .                                                 | s. d.<br>3 6            |                       | s. d.<br>4 10           |                       | s. d.<br>6 8            |                       | s. d.<br>4 10           |                       |

I shall first draw attention to the fact that of all the Continents of the globe, small but thickly populated Europe is the greatest producer of Wheat, its quota prior to the War being represented by an annual mean of 1,963 million bushels, or 43.6 per cent. of the World's total production. During the course of the War, as might have been anticipated, European mean production fell away to 1,561 million bushels, or 35.5 per cent. of World Production; thereafter its production remained more or less stationary for a period of seven years; finally, in the three years that followed



—1926-28—European mean production became normal again, although, owing to a general increase in World Production, Europe's percentage fell from 43.6 to 38.9 per cent.

It is clear, too, that during the War years and the years of settlement that followed, the other Continents made haste to make good Europe's Wheat deficiency. In this direction North America was the leader, rising from 897 million bushels, or 19.9 per cent. of the total, to 1,355 millions, or 26.7 per cent.; over the same period South America progressed from 4.0 to 5.6 per cent. of the World's production, and Australasia from 2.2 to 3.0 per cent. Africa and Asia, however, remained more or less stationary.

The net result of the position is that during the 1926-28 period World Mean Wheat Production increased by close on 600 million bushels per annum, relatively to Pre-War figures, or 12.7 per cent., whilst over the same period World population increased by 9.3 per cent. only. If, therefore, we assume Pre-War figures to represent fairly accurately World Wheat requirements relatively to population, it follows that there must have been an appreciable surplus in the 1926-28 period—approximately 462 million bushels per annum—and it is this surplus that has been mainly responsible for the drop in the price of Wheat. And since Europe is not only the largest producer of Wheat, but also the largest importer and consumer, it follows, too, that the chief beneficiaries of this recent World position have been European consumers, and the chief sufferers American farmers who, we have seen, have been officially recommended to curtail future sowings.

The position is further emphasised by a consideration of the amount of Wheat available for food after due allowance for Seed requirements in relation to World population. In this connection we may note that in Pre-War days wheat available for food was 2.41 bushels per head of population, and the mean Australian export value 3s. 6d. a bushel in 1913; during the War period there was a slight decline to 2.39 bushels, whilst prices were irregular, owing to difficulties of transport; during the seven years that followed the War there was a quite appreciable decline to 2.22 bushels, and mean export prices rose to 6s. 8d. in 1925; finally, in the 1926-28 period available wheat supplies rose to 2.46 bushels and mean export values declined in sympathy to 4s. 10d. in 1928; and since then the decline has been greater still.

Differences between figures given for Wheat available per head of population in the World may appear small in relation to their apparent influence on World prices. Nevertheless, it is a well-known fact that very small surpluses on any market suffice to bring down current prices; moreover, as there are millions of people in this world that never make any use whatsoever of Wheat, these figures would acquire far greater emphasis if they could be expressed in terms of the Wheat consumers of the World, instead of in terms of the World's total population.

#### AUSTRALIAN MEAN WHEAT CONSUMPTION.

Although I have not the means of indicating to you exactly what are the Wheat-consuming capacities of those countries that make a regular use of this cereal, purely Australian statistical data on the subject have been carefully kept and may be accepted by us as a basis for rough comparison. This question will acquire added importance when we come to consider later on the possibilities of increased consumption of Wheat in those countries in which but sparing use has as yet been made of it. According to the Commonwealth Statistician, mean figures for Australian Home Consumption of Wheat per head of population are as follows:—

|                                         | Bushels.    |
|-----------------------------------------|-------------|
| For Human Consumption . . . . .         | 5.042       |
| Fed to Live Stock . . . . .             | 0.482       |
| Used for Seed . . . . .                 | 1.806       |
| <b>Total Home Consumption . . . . .</b> | <b>7.33</b> |





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Hence, in round figures, the mean yearly consumption of Wheat in Australia has been represented by 5 bushels per head of population, whilst in the neighborhood of half a bushel has been fed to Pigs and Fowls. In order to complete Australian requirements in the matter of cereal foodstuffs, it should be added that we consume in addition in the neighborhood of 6lbs. of Oats and 6lbs. of Rice per head of population. Our total cereal foodstuffs requirements correspond, therefore, to an equivalent of  $5\frac{1}{2}$  bushels of Wheat. In this connection, it should not be overlooked that we are essentially a meat-eating rather than a bread-eating people, and prone, I am afraid, to be wasteful of foodstuffs which we usually find in profusion around us. Other nationalities, on the other hand, and in particular the Latin and Semitic races, and all those whose economic circumstances do not permit of the free use of meat, consume usually a greater proportion of cereal foodstuffs than is the case in Australia. Nevertheless, if the World Population as a whole were to consume as much Wheat per head as we do, current World Wheat Production could, to all intents and purposes, be doubled without undue embarrassment to World Markets.

#### WHEAT AND ITS SURROGATES.

But, as we have already had occasion to note, not only in present circumstances is it not possible to double current production of Wheat, but of recent years the markets of the World have been embarrassed by the presence of unabsorbed surpluses, which have led to appreciable decline in prices. It is clear, therefore, that there are teeming millions in this World that secure their farinaceous foodstuffs from other sources than Wheat. It is fairly obvious in this connection that there is a natural tendency among the inhabitants of any country to live upon the produce of the land they occupy; and in earlier times, when means of communication were defective, this tendency amounted to compulsion. Under these influences, and in the course of generations, special tastes and food customs have become firmly ingrained in those people that knew not Wheat, and the latter has in consequence to-day to face the competition of substitutes of varying merits.

An examination of the general position will serve to show that whereas for centuries Wheat has formed essential part of the dietaries of Western Europe, the Mediterranean countries and parts of Western Asia, its progress elsewhere has been slow, apart from America and Australasia, both of which continents have been colonised mainly from Western Europe. Rice, it may be pointed out, continues the staple cereal foodstuff of a large proportion of Asia, including China, India, Japan, &c., and although Wheat has succeeded in worming its way in, its position in these countries is still one of relatively small importance. Maize is the chief cereal foodstuff in Southern Africa, and to a less extent has encroached upon the territory of Wheat in Egypt, and other Mediterranean countries, the United States, and parts of South America. Even at the present time Rye is more extensively used for human consumption than Wheat in Russia and Central Europe generally. Sorghum and Millet grains supply the only cereal foodstuffs available in certain parts of Africa and Asia; Barley, apart altogether from its association with liquid refreshments, is in common use for human consumption in many countries. Beans, Pease, and Pulse generally supply the same needs as Wheat, and even vegetables and fruits rich in starch, such as potatoes, bananas, chestnuts, dates, &c., may be said on occasion to prove effective substitutes. And, finally, we ourselves, convinced Wheat-growers though we be, have not hesitated, under the guidance of thrifty Scotland, to go to the stables for part of our breakfast requirements.

It will be clear, therefore, that Wheat has hitherto met and will continue to meet in the future with many obstacles to its successful expansion over the World. And, unfortunately, the World War has introduced a new obstacle in the shape of the impoverishment of many normally Wheat consuming communities, who in consequence have been thrown back upon cheaper substitutes. It may be assumed, however, that this obstacle will disappear in the course of time, with the improvement of the economic position of



those concerned, and that as a result Wheat prices will eventually show a gradually improving tendency. I am bound, however, to point out that however much we may be prejudiced in favor of Wheat as an article of diet, we cannot claim, apart from questions of tastes, which vary with every individual, that Wheat is essentially superior as a foodstuff to many of its substitutes. On a basis of Starch Equivalence, for instance, 100lbs. of Rice or Maize may be counted upon to go as far in the matter of food values as 115lbs. of Wheat or Rye. The only real advantage that can be claimed for Wheat in this connection is its relatively high contents of digestible Protein, and of the latter we usually make but little use in our anxiety to secure a perfectly White Loaf.

I shall now endeavor to show in what quantities the various cereal foodstuffs have in the aggregate been available to Man within recent times. In this connection it is necessary to note that Wheat, and particularly some of its substitutes, are not reserved exclusively for human food; a proportion of these foodstuffs goes to meet the requirements of domesticated Live Stock, and particularly is this the case of Oats, Barley, and Maize; but, unfortunately, available data are insufficient to enable us to distinguish on a World wide basis between what is reserved for Man and what is fed to Live Stock. Hence, in the Table that follows I have restricted myself to the four chief Cereals, namely, Wheat, Rye, Rice, and Maize, leaving to Live Stock the balance of the substitutes for Wheat. This arrangement will enable us to get a rough and ready appreciation of the position.

TABLE II.—*Showing Estimated Mean Total World Production (1926-28) of Wheat, Rye, Rice, and Maize in relation to World Population.*

|                                                                | Short Tons<br>(2,000lbs.) |
|----------------------------------------------------------------|---------------------------|
| Wheat .....                                                    | 152,187,000               |
| Rye .....                                                      | 49,361,928                |
| Rice .....                                                     | 92,500,000                |
| Maize .....                                                    | 126,801,623               |
| World Total .....                                              | 420,850,551               |
| Less allowance for Seed .....                                  | 123,284,500               |
| Estimated aggregate available for Human Consumption .....      | 297,566,051               |
| World Population (1928) .....                                  | 1,914,058,810             |
| Quantity of cereals per head assumed to be available .....     | 311lbs.                   |
| Equivalent to .....                                            | 5.18bushs. of Wheat       |
| Corresponding Australian figure, including Rice and Oats ..... | 5.24bushs.                |

From the above it will be clear that the World has not been in danger of starvation within recent times, except perhaps in countries in which means of distribution and communication are still more or less inadequate. It is worthy of note that the quantity of Cereal Food per head of population estimated to have been available for World consumption, namely, the equivalent of 5.18 bushels of Wheat, corresponds almost exactly to the statistically determined Australian figure, namely, the equivalent of 5.24 bushels of Wheat.

As a matter of general interest it can be added that for the same period—1926-28—the mean World Production of Oats was represented by 91,504,100, and that of Barley by 42,943,523 short Tons.

#### CHIEF WHEAT GROWING COUNTRIES OF THE WORLD.

We can now come to closer grips with the question, and consider in detail which are the countries of the World chiefly concerned in Wheat growing. The extreme adaptability of Wheat as a cultivated plant is shown by the wide range of climate and soil over which it has successfully extended. This fact may be gathered from the large number of Wheat-growing countries enumerated in Table III., and illustrated on the



accompanying map.\* These Wheat-growing countries have been placed in order of their mean total Production for the 1924-28 period, representing the latest Statistical data available at the time of writing. In addition to total production figures, the Table includes mean areas under Wheat in each country, percentages which total production in each country bears to World Production, and the mean yield per acre in each country.

TABLE III.—*Statistical Data, 1924-28, concerning Main Wheat-growing Countries of the World.*

|                                | Mean<br>Areas.<br>1,000 Acres. | Mean Total<br>Production.<br>1,000bush. | Production<br>Percentage.<br>% | Mean Yield<br>per Acre.<br>Bush. |
|--------------------------------|--------------------------------|-----------------------------------------|--------------------------------|----------------------------------|
| United States of America . . . | 55,382                         | 810,802                                 | 15.98                          | 14.64                            |
| Russia . . . . .               | 62,405                         | 663,367                                 | 13.08                          | 10.63                            |
| China . . . . .                | 42,179                         | 590,500                                 | 11.64                          | 14.00                            |
| Canada . . . . .               | 22,376                         | 382,417                                 | 7.54                           | 17.09                            |
| India . . . . .                | 31,164                         | 336,877                                 | 6.64                           | 10.81                            |
| France . . . . .               | 13,390                         | 279,982                                 | 5.52                           | 20.91                            |
| Argentina . . . . .            | 18,455                         | 210,570                                 | 4.15                           | 11.41                            |
| Italy . . . . .                | 11,978                         | 206,862                                 | 4.08                           | 17.27                            |
| Spain . . . . .                | 10,671                         | 143,950                                 | 2.84                           | 13.49                            |
| Australia . . . . .            | 10,576                         | 139,506                                 | 2.75                           | 13.20                            |
| Germany . . . . .              | 3,939                          | 105,842                                 | 2.09                           | 26.87                            |
| Roumania . . . . .             | 7,967                          | 95,696                                  | 1.89                           | 12.01                            |
| Hungary . . . . .              | 3,608                          | 68,772                                  | 1.36                           | 19.06                            |
| Jugo-Slavia . . . . .          | 4,321                          | 66,104                                  | 1.30                           | 15.30                            |
| United Kingdom . . . . .       | 1,628                          | 53,138                                  | 1.05                           | 32.64                            |
| Poland . . . . .               | 2,725                          | 47,931                                  | 0.94                           | 17.59                            |
| Bulgaria . . . . .             | 2,572                          | 41,593                                  | 0.82                           | 16.17                            |
| Japanese Empire . . . . .      | 2,047                          | 40,613                                  | 0.80                           | 19.84                            |
| Turkey . . . . .               | 3,968                          | 39,510                                  | 0.78                           | 10.00                            |
| Egypt . . . . .                | 1,498                          | 37,997                                  | 0.75                           | 25.36                            |
| Czecho-Slovakia . . . . .      | 1,536                          | 36,516                                  | 0.72                           | 23.77                            |
| Chile . . . . .                | 1,483                          | 26,011                                  | 0.51                           | 17.53                            |
| Algeria . . . . .              | 2,543                          | 25,425                                  | 0.50                           | 10.00                            |
| Morocco . . . . .              | 2,546                          | 24,437                                  | 0.48                           | 9.60                             |
| Belgium . . . . .              | 363                            | 14,142                                  | 0.28                           | 38.94                            |
| Syria . . . . .                | 1,288                          | 12,880                                  | 0.25                           | 10.00                            |
| Greece . . . . .               | 1,147                          | 12,028                                  | 0.24                           | 10.48                            |
| Uruguay . . . . .              | 1,006                          | 11,266                                  | 0.22                           | 11.20                            |
| Sweden . . . . .               | 367                            | 11,082                                  | 0.22                           | 30.24                            |
| Portugal . . . . .             | 1,038                          | 10,939                                  | 0.22                           | 10.54                            |
| Mexico . . . . .               | 1,039                          | 10,390                                  | 0.20                           | 10.00                            |
| Austria . . . . .              | 494                            | 10,155                                  | 0.20                           | 20.54                            |
| Tunis . . . . .                | 1,195                          | 9,563                                   | 0.19                           | 8.00                             |
| Denmark . . . . .              | 216                            | 8,447                                   | 0.17                           | 39.16                            |
| Union of South Africa . . . .  | 828                            | 7,653                                   | 0.15                           | 9.13                             |
| New Zealand . . . . .          | 206                            | 6,575                                   | 0.13                           | 31.93                            |
| Netherlands . . . . .          | 132                            | 5,198                                   | 0.10                           | 39.38                            |
| Lithuania . . . . .            | 272                            | 4,514                                   | 0.09                           | 16.61                            |
| Brazil . . . . .               | 263                            | 4,303                                   | 0.08                           | 16.39                            |
| Switzerland . . . . .          | 116                            | 3,748                                   | 0.07                           | 32.38                            |
| Peru . . . . .                 | 247                            | 2,851                                   | 0.05                           | 11.55                            |
| Cyprus . . . . .               | 184                            | 2,035                                   | 0.04                           | 11.07                            |
| Finland . . . . .              | 40                             | 927                                     | 0.02                           | 23.46                            |
| Luxemburg . . . . .            | 29                             | 547                                     | 0.01                           | 18.70                            |
| Norway . . . . .               | 23                             | 544                                     | 0.01                           | 24.15                            |
| Guatemala . . . . .            | 26                             | 200                                     | —                              | 7.75                             |
| Southern Rhodesia . . . . .    | 4                              | 24                                      | —                              | 7.31                             |
| Other Countries . . . . .      | 30,870                         | 448,471                                 | 8.85                           | 14.53                            |
| World Wheat Production         | 362,350                        | 5,072,900                               | 100.00                         | 14.00                            |

It will be observed that within recent years the mean yearly Wheat Production of the World has exceeded 5,000 million bushels garnered from over 362 million acres, representing a general mean yield per acre of 14 bushels. There is no other cultivated crop that occupies areas of equal importance; and yet, relatively to the dry surface

\*See inset at the end of this issue.



of the globe, this vast area does not represent much more than 1 per cent.: it could, in fact, be tucked away in one-fifth of the area of Australia as has been indicated in the accompanying map, and this should lead to the belief that if in the course of time the World should require more Wheat, there would still remain ample room for expansion.

In the matter of Total Production the United States, Russia, and China, aggregating more than 40 per cent. of World Production, are a long way in the lead. Other countries of importance in this connection are Canada, India, and France, which together aggregate close on 20 per cent. of World Production; whilst Australia comes tenth on the list with 2.75 per cent. of World Production. Nevertheless, Australia has made considerable progress within recent times, and will in the course of time occupy a far more important position among World Wheat Producers. Data relative to Australia's progress as a Wheat Grower are shown below in Table IV.:—

TABLE IV.—*Australian Wheat Statistics for the Current Century.*

| Quinquennial Periods.           | Mean Areas<br>Under Wheat<br>per Annum.<br>Acres. | Mean Production per Annum. |                    | Mean<br>Population. |
|---------------------------------|---------------------------------------------------|----------------------------|--------------------|---------------------|
|                                 |                                                   | Total.<br>Bush.            | Per Acre.<br>Bush. |                     |
| 1900-04 .....                   | 5,554,949                                         | 45,595,661                 | 8.21               | 3,897,213           |
| 1905-09 .....                   | 5,867,510                                         | 66,456,338                 | 11.33              | 4,203,678           |
| 1910-14 .....                   | 8,215,684                                         | 77,393,187                 | 9.42               | 4,708,026           |
| 1915-19 .....                   | 9,640,292                                         | 113,566,708                | 11.78              | 5,051,516           |
| 1920-24 .....                   | 9,388,094                                         | 134,593,901                | 14.34              | 5,661,596           |
| 1925-28 .....                   | 12,270,137                                        | 133,297,861                | 10.86              | 6,168,560           |
| Total mean increase in 29 years | 6,715,188                                         | 87,702,200                 | —                  | 2,271,347           |
| Percentage increase in 29 years | 120.9%                                            | 192.3%                     | —                  | 58.3%               |

Thus, then, in the course of 29 years, and on the basis of means of successive quinquennial periods, our area under Wheat has more than doubled, our production of Wheat has nearly trebled, whilst over the same period the increase in our population has been slightly over one-half. And there is every reason for believing that during the next 30 years corresponding improvements will be made both in areas and in total production of Wheat. It may be anticipated that by that time Australia's Wheat contribution will be in the neighborhood of 400 million bushels, that is to say, corresponding to present-day Canadian production. This increased production will come chiefly from extension in areas sown in Western Australia and New South Wales, and from all-round improvement in mean yields per acre in all of the Wheat-growing States as a result of wider application of improved methods of farming and more thorough reclamation from scrub of existing areas.

#### WORLD MEAN YIELDS PER ACRE.

A glance at the last column of Table III. will serve to show that mean yields per acre vary within very wide limits, from 7.31 bushels in Rhodesia to 39.38 bushels in the Netherlands, the mean yield of the World being exactly 14 bushels. Now, there may be an inclination to look upon these enormous differences in yield as the natural results of good and poor farming methods respectively: and whilst there is certainly something to be said for that point of view the main limiting factor may be said to be climate. It can be said generally that those countries in which the mean growing period of Wheat is longest will in the long run secure the highest mean yields per acre. Countries such as Great Britain, New Zealand, &c., in which Winter-sown wheat takes 10 months to come to maturity will almost invariably show higher mean yields per acre than countries such as Australia, the Union of South Africa, &c., in which Wheat comes to maturity in six to seven months. At the same time, the influence of good farming methods on yields within the limits imposed by climate cannot be denied: and in this direction the more advanced countries will inevitably show up to better advantage than corresponding countries in which backward methods are in more common use. Finally, there



is the fact that in some countries Wheat growing is carried out on intensive lines and small individual areas, and in others on extensive lines and large individual areas: it is clear that other things being equal, the mean yields per acre of the former will usually exceed those of the latter, and occasionally very considerably. The Netherlands, Denmark, and Belgium have already shown what can be done in this direction.

#### INTERNATIONAL TRADE IN WHEAT.

The importance of any country on the wheat markets of the World is not, however, determined by its total production, but by the size of its mean surplus above local requirements: it is this exportable surplus which enters into International trade and alone determines the standing of the country concerned. From the latter point of view Wheat-consuming countries may be separated into two groups, namely (1) Wheat-exporting countries, which are very limited in numbers, and (2) Wheat-importing countries which are far more numerous. Data concerning these two groups have been given in Tables V. and VI., respectively:—

TABLE V.—*Mean Net Exports (i.e., Exports less Imports) per Annum, of Wheat (including Flour) of chief World Exporters (1925-27).*

|                     | Net Exports. |             | Percentages. |        |
|---------------------|--------------|-------------|--------------|--------|
|                     | Bushels.     | Bushels.    | %            | %      |
| Canada.....         | 273,005,000  |             | 35.60        |        |
| United States ..... | 184,284,000  |             | 24.03        |        |
| Argentina .....     | 121,098,000  |             | 15.79        |        |
| Australia .....     | 99,307,000   |             | 12.95        |        |
|                     |              | 677,694,000 |              | 88.37  |
| Russia .....        | 25,529,000   |             | 3.33         |        |
| India .....         | 20,182,000   |             | 2.63         |        |
| Hungary .....       | 18,351,000   |             | 2.39         |        |
| Jugo-Slavia .....   | 10,384,000   |             | 1.35         |        |
| Rumania .....       | 7,784,000    |             | 1.02         |        |
| Chile .....         | 3,181,000    |             | 0.41         |        |
| Bulgaria.....       | 1,579,000    |             | 0.21         |        |
| Tunis .....         | 1,056,000    |             | 0.14         |        |
| Algeria .....       | 871,000      |             | 0.11         |        |
| Spain .....         | 279,000      |             | 0.04         |        |
|                     |              | 89,196,000  |              | 11.63  |
|                     |              | 766,890,000 |              | 100.00 |

It should be observed that during the 1925-27 period the mean quantity of Wheat available for international trade was represented by 766,890,000 bushels per annum, and that towards this total four countries contributed over 88 per cent. of the World's requirements. Among these four countries Australia occupied the fourth position, her export quota representing 13 per cent. of the World's net export trade, whereas her total production represented 2½ per cent. only of World production. If in 30 years' time Australia's Wheat Production should, as I anticipate, attain to 400 million Bushels and her population to 10 millions, our Wheat Export surplus should then be in excess of 325 million bushels; that is to say, a quantity greater than Canada's present day export surplus. We should by that time occupy a commanding position on the markets of the World. It can be added, on the other hand, that the rapidly expanding population of the United States points to the probability that the latter country will eventually withdraw from the ranks of exporters, in which case she would probably be succeeded by Russia.

Consideration can next be given to the requirements of the chief Wheat Importing countries of the World.



TABLE VI.—*Mean Net Imports (Imports less Exports) per Annum, of Wheat (including Flour) of the chief importing Countries (1925-27).*

|                               | Net Imports. |             | Percentages. |        |
|-------------------------------|--------------|-------------|--------------|--------|
|                               | Bushels.     | Bushels.    | %            | %      |
| Great Britain and Ireland ... | 225,867,000  |             | 29.45        |        |
| Italy .....                   | 82,427,000   |             | 10.75        |        |
| Germany .....                 | 73,563,000   |             | 9.59         |        |
| France .....                  | 42,827,000   |             | 5.58         |        |
| Belgium .....                 | 39,408,000   |             | 5.14         |        |
|                               |              | 464,092,000 | —            | 60.51  |
| Brazil .....                  | 29,036,000   |             | 3.79         |        |
| Netherlands .....             | 27,253,000   |             | 3.55         |        |
| Czecho-Slovakia .....         | 21,062,000   |             | 2.75         |        |
| China .....                   | 20,525,000   |             | 2.68         |        |
| Greece .....                  | 19,961,000   |             | 2.60         |        |
| Japanese Empire .....         | 16,915,000   |             | 2.21         |        |
| Austria .....                 | 15,868,000   |             | 2.07         |        |
| Switzerland .....             | 15,273,000   |             | 1.99         |        |
| Egypt .....                   | 10,227,000   |             | 1.33         |        |
| Sweden .....                  | 7,767,000    |             | 1.01         |        |
| Poland .....                  | 7,475,000    |             | 0.98         |        |
| Denmark .....                 | 6,356,000    |             | 0.83         |        |
| Norway .....                  | 5,918,000    |             | 0.77         |        |
| Cuba .....                    | 5,896,000    |             | 0.77         |        |
| Union of South Africa .....   | 5,636,000    |             | 0.74         |        |
| Finland .....                 | 4,648,000    |             | 0.61         |        |
| New Zealand .....             | 2,917,000    |             | 0.38         |        |
| Syria and Lebanon .....       | 2,404,000    |             | 0.31         |        |
| Latvia .....                  | 1,720,000    |             | 0.22         |        |
| French Indo-China .....       | 1,109,000    |             | 0.14         |        |
| Estonia .....                 | 901,000      |             | 0.12         |        |
| Ceylon .....                  | 871,000      |             | 0.11         |        |
|                               |              | 229,738,000 | —            | 29.96  |
| Other Countries .....         | —            | 73,060,000  | —            | 9.53   |
| Total Net Exports .           | —            | 766,890,000 | —            | 100.00 |

Again, as in the case of Net Exports, we may note that the major portion of Net Imports was absorbed in the 1925-27 period by a small number of nations. In this connection, five European nations received over 60 per cent. of the World's exportable Wheat, and among these Great Britain and Ireland received close on 30 per cent. As to the balance, 17½ per cent. went to other European nations, 12½ per cent. to other parts of the globe, and 9½ per cent. to unspecified countries. It must be clear, therefore, that in existing circumstances, Europe, and Great Britain in particular, must continue the determining factor in the matter of Wheat prices, so long as the available surplus is slightly in excess of the demand.

#### WORLD WHEAT CONSUMPTION.

We are now in a position to show what have been in recent years the consumption and wheat requirements of the Continental Divisions of the globe:—

TABLE VII.—*Summarising Apparent Wheat Consumption of the Continental Divisions of the Globe (1924-28).*

|                                  | Local Production.       |                       | Net Imports (+)<br>or<br>Net Exports (—) |                       | Local Production,<br>Plus Imports,<br>Less Exports. |                       | Wheat Apparently Available<br>for Consumption,<br>after Deduction of Seed. |                       |                                 |
|----------------------------------|-------------------------|-----------------------|------------------------------------------|-----------------------|-----------------------------------------------------|-----------------------|----------------------------------------------------------------------------|-----------------------|---------------------------------|
|                                  | Millions<br>of<br>Bush. | Per-<br>cent-<br>age. | Millions<br>of<br>Bush.                  | Per-<br>cent-<br>age. | Millions<br>of<br>Bush.                             | Per-<br>cent-<br>age. | Millions<br>of<br>Bush.                                                    | Per-<br>cent-<br>age. | Per head<br>of Popu-<br>lation. |
| Europe .....                     | 1,970.5                 | 38.9                  | + 556.1                                  | 89.7                  | 2,526.6                                             | 49.8                  | 2,326.1                                                                    | 51.3                  | 4.91                            |
| North & Central<br>America ..... | 1,355.4                 | 26.7                  | — 447.3                                  | 72.2                  | 908.1                                               | 17.9                  | 775.0                                                                      | 17.1                  | 4.81                            |
| Asia .....                       | 1,200.6                 | 27.1                  | + 40.7                                   | 6.6                   | 1,241.3                                             | 24.5                  | 1,094.5                                                                    | 24.1                  | 1.03                            |
| South America ...                | 282.6                   | 5.6                   | — 76.3                                   | 12.3                  | 206.3                                               | 4.1                   | 170.6                                                                      | 3.8                   | 2.25                            |
| Oceania .....                    | 152.7                   | 3.0                   | — 96.3                                   | 15.5                  | 56.4                                                | 1.1                   | 45.1                                                                       | 1.0                   | 4.63                            |
| Africa .....                     | 111.1                   | 2.3                   | + 23.1                                   | 3.7                   | 134.2                                               | 2.6                   | 123.1                                                                      | 2.7                   | 0.92                            |
| World totals ...                 | 5,072.9                 | 100.0                 | —                                        | —                     | 5,072.9                                             | 100.0                 | 4,534.4                                                                    | 100.0                 | 2.46                            |



It will be observed in this connection that the European apparent consumption of Wheat has been represented by 50 per cent. of the World's total production, or over 51 per cent. of the total apparently available for human consumption after deduction of seed requirements. European mean consumption per head of population (4.91bush.) is also higher than that of any other Continental Division. Second in importance in relation to quantity of Wheat consumed is Asia with its teeming millions, and third, North America: the remaining Continental Divisions—South America, Oceania, and Africa—absorb in the aggregate  $7\frac{1}{2}$  per cent. only of World Wheat available after deduction of normal seed requirements.

#### WORLD WHEAT-HARVESTING MONTHS.

Related to the vicissitudes of marketing Wheat is the particular time of the year when it became available for sale. In this connection, it is worth noting that so varied are the climatic conditions under which Wheat is grown that there is no month in the year in which Wheat is not harvested in some part of the World or other. This point may be illustrated by the following brief summary:—

##### *January:*

New Zealand, Tasmania, Argentina, Chile, Uruguay, &c.

##### *February and March:*

India, Upper Egypt, Abyssinia, &c.

##### *April:*

Turkey, Persia, Syria, Mexico, &c.

##### *May:*

China, Japan, Syria, Lower Egypt, Florida, &c.

##### *June:*

Spain, Portugal, Greece, Italy, Algeria, Tunis, Morocco, California, &c.

##### *July:*

France, Austria, Hungary, Rumania, Southern Russia, Poland, Lower Canada, Minnesota, Colorado, &c.

##### *August:*

Britain, Belgium, Holland, Germany, Poland, &c.

##### *September and October:*

Canada, Northern Russia, Sweden, Scotland, &c.

##### *November:*

Peru, parts of South Australia, &c.

##### *December:*

Australia, Argentina, Chile, Burmah, &c.

But as exporters of Wheat we are interested not so much in harvest dates of Wheat-growing countries in general, as of those with definite exportable surpluses. In this connection it is a matter for congratulation that these exportable surpluses should be found distributed both in the Northern and the Southern Hemisphere: it follows that new wheat does not flood the markets of the World to the same extent as would otherwise have been the case. If we revert back to Table V. we shall see that out of 767 million bushels of net export Wheat, 523 millions come from the Northern and 244 millions from the Southern Hemisphere, that is to say, 68.2 per cent. and 31.8 per cent. of the aggregate total respectively: hence, it can be stated roughly that one-third of the exportable World Wheat becomes available in the first half of the calendar year, and two-thirds in the second half. And, although as denizens of the Southern Hemisphere our Export Wheat is more or less influenced by the abundance or deficiency of the preceding harvest in the Northern Hemisphere, it is much to our advantage that we should be in direct competition with one-third of the World's export surplus rather than with two-thirds. It is to be anticipated, however, that with the extension and improvement of Wheat growing both in Australia and South America, coupled with



the increased consuming requirements in North America, the relative proportions between the respective surpluses of the Northern and Southern Hemispheres will eventually be more nearly equalised.

In so far as we personally are concerned our immediate rivals are Argentina, India, and Chile: of the latter, Indian wheat becomes available earlier, and Argentine and Chilian Wheat slightly later than Australian Wheat.

#### CONCLUDING REMARKS.

And lastly, we come to a consideration of what the future may have in store for us as Wheat Growers. I have already indicated that recent supplies have outstripped demands to the extent of bringing the market value of Wheat below costs of production; at the same time I have expressed the opinion that possibilities of future progress in the Commonwealth are intimately related to our ability to extend our Wheat Fields and expand the mean production therefrom. No doubt these two propositions may appear to be more or less at variance one with the other; nevertheless, given the will, it is not impossible to reconcile them. In the first place, one of the reasons of the temporary glut in Wheat on the markets of the World, is the War impoverishment of many countries, and their inability to pay its price, with the result that many normal consumers of Wheat have had to fall back upon cheaper substitutes. It is fairly certain that the fall in price that has been the natural consequence of the glut, may prove a blessing in disguise and lead among normal Wheat consumers to a more extensive use of Wheat than has recently obtained, and eventually to a healthier tone on the markets of the World. I indicate below in Table VIII. a few examples of the cereal consumption of various countries with a view to stressing the fact that even in normally Wheat consuming nations there are still many substitutes to be displaced.

TABLE VIII.—Showing Estimated Apparent Cereal Consumption per Head of Population of a Few Typical Countries.

#### I. MAINLY WHEAT CONSUMERS.

|                      | Wheat.<br>Lbs. | Rye.<br>Lbs. | Rice.<br>Lbs. | Maize.<br>Lbs. | Total.<br>Lbs. | Equivalent<br>to Wheat.<br>Bush. |
|----------------------|----------------|--------------|---------------|----------------|----------------|----------------------------------|
| Italy .....          | 399            | 8            | 11            | 134            | 552            | 9.20                             |
| France .....         | 439            | 46           | 9             | 53             | 547            | 9.12                             |
| Spain .....          | 356            | 58           | 13            | 89             | 516            | 8.60                             |
| United Kingdom ..... | 340            | 1            | 5             | 96             | 442            | 7.37                             |
| United States .....  | 278            | 7            | 9             | 129            | 423            | 7.05                             |
| Australia .....      | 330            | 1            | 6             | 71             | 408            | 6.80                             |
| Greece .....         | 287            | 15           | 3             | 72             | 377            | 6.28                             |

#### II. LARGELY RYE CONSUMERS.

|                       |     |     |   |    |     |       |
|-----------------------|-----|-----|---|----|-----|-------|
| Russia .....          | 237 | 324 | 1 | 68 | 630 | 10.50 |
| Czecho-Slovakia ..... | 228 | 217 | 8 | 88 | 541 | 9.02  |
| Austria .....         | 225 | 188 | 8 | 90 | 511 | 8.52  |
| Poland .....          | 99  | 376 | 2 | 11 | 488 | 8.13  |
| Germany .....         | 163 | 268 | 8 | 30 | 469 | 7.80  |
| Sweden .....          | 179 | 200 | 2 | 38 | 419 | 6.91  |
| Estonia .....         | 49  | 356 | 1 | 1  | 407 | 6.71  |
| Finland .....         | 92  | 271 | 1 | 2  | 366 | 6.10  |

#### III. MAINLY RICE CONSUMERS.

|                         |    |   |     |    |     |      |
|-------------------------|----|---|-----|----|-----|------|
| French Indo-China ..... | 16 | — | 410 | 50 | 476 | 7.93 |
| Philippines .....       | 50 | — | 255 | 88 | 393 | 6.55 |
| Japanese Empire .....   | 46 | — | 306 | 6  | 358 | 5.97 |
| India .....             | 51 | — | 240 | 9  | 300 | 5.00 |
| Cuba .....              | 99 | — | 125 | 52 | 276 | 4.60 |

#### IV. LARGELY MAIZE CONSUMERS.

|                             |     |    |    |     |     |       |
|-----------------------------|-----|----|----|-----|-----|-------|
| Rumania .....               | 308 | 30 | 2  | 376 | 716 | 11.93 |
| Egypt .....                 | 191 | —  | 27 | 311 | 529 | 8.82  |
| Union of South Africa ..... | 105 | 6  | 1  | 366 | 478 | 7.97  |
| Brazil .....                | 54  | —  | 31 | 227 | 312 | 5.20  |



It should be observed that figures given in Table VIII. setting out cereals apparently available for human consumption in various countries are only approximately correct: it is clear that in many instances portion of the quantities shown to be available is actually consumed by Live Stock. This is particularly the case for Maize, although due allowance has been made for this fact in the case of the United States, from which comes about 75 per cent. of the World's Production.

Of the three Cereals that are shown to be in active rivalry with Wheat, we may anticipate that Rye will prove the easiest to overcome: towards that end, general improvement in the economic position of the World, and of Europe in particular, should do much. It seems probable, too, that eventually the resistance of Maize will not prove insuperable. Rice on the other hand, apart from its adaptability to conditions obtaining in those countries in which it finds readiest acceptance, derives its greatest strength from the inertia of the East: nor in these countries is it likely to decline to the position of a secondary cereal: not in our times, at all events. Notwithstanding these facts, it is certain that the gradual penetration of Western ideas and customs into the East, will have the effect of opening the way to Wheat, even in these most conservative of countries.

And, finally, let me stress the fact that although in the main it is the aim of the Nations of the World to maintain themselves from the products of the land they occupy politically, the modern tendency towards industrialisation is such that they are failing to do so in ever-increasing numbers. Hence, in modern times, the importers of essential foodstuffs, and particularly of Wheat, are many, whilst corresponding exporters form part of a gradually diminishing band. Modern hygiene, on the other hand, and modern control of Law, have led to so unprecedented an expansion in World population, as to fill with dismay economists and other pessimists, who have painfully visualised gradual World starvation in no distant future. And should these jeremiads eventuate—although I fear we shall not be there to verify them—Australia would be among the last of those happy few whose destiny it is to feed the hungry of other lands: and since charity usually begins at home, Australians, subject to adequate defensive measures, should be among the last to starve.

Again, it is an unfortunate fact, but nevertheless a well-established historical fact, that the isolated food producers of the World have always paid tribute to the organised fighters and urban communities who have found something more profitable to do than primary production; and to the extent that Wheat-growers are unable to-day to collect costs of production, they may be said to labor to-day under the same disabilities as their predecessors of past ages. We are sometimes told that Wheat can be grown cheaper in Australia than anywhere else in the World. It would be interesting to know who was first responsible for this statement; whether it was made some fifty years ago, or whether it is a present-day fiction. If we place no money value on the Labor and sweat of farmers and their families, if we overlook the tariff and other obstacles that hamper primary production throughout the Commonwealth, the theory of the cheapness of local primary production would probably be true, but not otherwise. In the matter of Wheat we have certainly had to face within recent years prices that do not meet mean costs of production; and yet we cannot give up producing Wheat. And in the absence of relief from other quarters, wheat-growers are thrown back upon themselves, and the only weapons within reach are maximum production per acre, and highest quality in sample delivered that soil and season permit of, coupled with judicious association of all possible farm side lines, and in his own interests and in those of the State, such should be the aim of every good Farmer.



## POSSIBILITIES OF THE SOUTH-EAST.

[An address delivered by W. J. SPAFFORD, Deputy Director of Agriculture, before a public meeting at Naracoorte on November 13th, 1930.]

In the light of present experience it appears that the possibilities of the South-East of South Australia all lie in the direction of agricultural development, and as the principal requirements of agriculture—climate, soils, and water supply—are all particularly favorable for rural production, the prospects of great progress being attained are very bright.

## CLIMATE.

The climate is essentially of a *temperate* character, with temperatures sufficiently low to enable it to be described as “cool.” The district receives an average rainfall varying from a little over 19ins. per annum at the northern end to about 35ins. per annum in the southern portions, and although a high proportion of the rain falls during the winter, on the whole the distribution throughout the year is good, and as a consequence all crops suited to temperate climates can be successfully grown in those parts of this country where the soils are sufficiently fertile.

## SOILS.

In such an extensive tract of country it is natural to expect to find several different types of soil, and the kinds which occur are represented by (a) *heavy-textured black and grey silts*, (b) *volcanic loams*, (c) *peats*, (d) *greyish loams*, (e) *chocolate-colored heavy loams*, (f) *stony land*, (g) *sands*. The *silty soils* are found on the low-lying flats between the ranges of hills, and mostly possess high fertility, but because of their location, most of them are too wet to be brought under cultivation, and will remain so until more drainage work has been undertaken. When adequately drained these *silts* produce heavy crops of cereals, roots, forage, and pastures. The *volcanic soils* are also very fertile, and suitable for most temperate-climate crops, and are naturally well-drained, and of such light texture that they are easily worked. *Peaty soils* are not seen in very large areas, but are to be found in many parts of the district, and in the aggregate total a fairly considerable area. When adequately drained these *peaty soils* will produce heavy root crops, and will grow forage and pasture plants luxuriantly. The *greyish loams* are to be found wherever Red Gums develop into large trees in this part of the State, and in practically all cases they rest on impervious clays fairly close to the surface. Subterranean Clover grows particularly well on these soils, provided that plenty of phosphatic fertiliser is applied to the crop, and the plant yields such a bulk of high-class fodder that this land can be profitably devoted to livestock farming. The *chocolate-colored soils with heavy texture*, to be found on some of the flats, although sour, are otherwise really fertile, and when properly cleared and sweetened, should produce very heavy crops, particularly of cereals and grasses. There is a fair amount of *stony land* in the district, and some of the stone is in such large sheets that the land is quite unsuitable for agricultural purposes, whilst in other places where the stone is not so plentiful, particularly in the high land, it can be used for cereals and pastures. Nearly all of the *sandy soils* are of a whitish color, and of low agricultural value, but they have proved suitable for the growth of the Remarkable Pine and Broad-leaved Wattle, and under present conditions are better adapted for the production of timber and wattle bark than ordinary farm produce.

## WATER SUPPLY.

In most parts of the country water of sufficiently good quality to be used for household purposes is to be obtained at shallow depths, and even in the few places where ‘ho



## PIGS.

The keeping of pigs becomes a necessity when dairying is being practised, but to enable us to make profitable progress with pig-raising on a large scale, we will have to develop an export trade in pig products of first-class quality. When this has been attained, we will probably do as the other exporters of the best pig products, i.e., use *Large White boars* to produce the ideal side of bacon required in large quantities by Great Britain.

## POULTRY.

Poultry do well in the South-East, and as an export trade has been worked up for eggs, there is every reason why this industry should be developed. The proximity of the South-East to Melbourne should make it possible for the rearing of table poultry to prove highly profitable.

## CROPS.

The natural conditions obtaining in this part of the State so favor the production of a large assortment of crops that it must always be an important producer of crops for human consumption.

*Wheat*.—At present wheat-growing is the third most important rural activity of the South-East, and the area under this crop will become greater and greater as reclamation is pushed on. Because it is so readily saleable there is always this strong incentive to grow wheat wherever it is possible, and with the clearing of land in the northern end of the district, and the drainage of the silty flats, this crop will be encouraged.

*Barley*.—Such high yields can be secured from barley that it will always be a prominent crop in the district, and when livestock farming is the rule the grain will be of greater value.

*Potatoes*.—Only about one-half of the potatoes required in the State are grown here, and there is plenty of suitable land in the South-East to more than supply our requirements of this foodstuff.

*Vines*.—There are very few crops which return so much of the cost of production to labor as does the growing of grapes, and there are large areas in the South-East suitable for the production of good-quality wines. When the fear of prohibition dies down there will, in all probability, be an increase in the area under vines.

*Sugar Beet*.—Cheap sugar of good quality is produced from sugar beet, and much of the South-East is suitable for the production of the crop. This particular crop demands such good work that the agricultural operations of all districts where it has been introduced have been much improved.

*Berries and Nuts*.—The plants producing berries and nuts usually result in high money returns per acre, and most of these crops can be successfully grown in the district. This particularly applies to such crops as strawberries, almonds, and walnuts.

*Tobacco*.—It appears that there is quite a fair chance of the tobacco crop proving successful in some parts of the South-East. If this proves to be so, the introduction of the crop will lead to big money returns being secured, and an improvement to farming practices in general in those districts where it is successful.

*Irrigation*.—The underground water is so good, and is found at such shallow depths in most parts of the district, that the possibilities of irrigating crops must not be neglected. Extremely heavy yields of most temperate-climate crops can be expected, and the use of a little extra water in the summer months will enable a number of summer-growing crops to be successfully produced, where they are a little doubtful at present. Such crops as Maize, Sorghum, Mangels, Turnips, Lucerne, &c., can be produced for a certainty with a little added water.

*Phosphates*.—Success with all crops, whether they be annuals or long-period crops, is dependent on liberal applications of phosphatic fertilisers, to nearly all soils of the South-East. Most crops warrant dressings approaching the equivalent of 2cwt. Superphosphate per acre per year, and some can do with a good deal heavier dressings.



## THE PROBLEMS OF THE "OFF" YEAR IN APPLE CULTIVATION.

*[Paper read by Mr. H. N. Wicks, Balhannah, Vice-Chairman Advisory Board of Agriculture, at the Forty-first Annual Congress of the Agricultural Bureau.]*

Apple production within the Commonwealth has grown during the last few years to such an extent that it now holds a very important place in the production of wealth. With the growth of the industry there came the increase in pests and natural enemies of the apple, which, of course, have, and will increase proportionately as the industry grows.

Being a young country, our present list of pests and diseases is a very formidable one indeed, but, nevertheless, is very small compared with some other parts of the world where apples are grown as a commercial proposition. With the coming of these pests also came the knowledge with regard to the control of same, so that at the present time, thanks to the scientist and chemist, there are few, if any, diseases or pests which the commercial apple grower would admit were of such significance as to warrant the abandonment of his business of apple production, and yet it is only a few years ago when orchards of considerable size in South Australia were grubbed up and destroyed, owing to the belief that the codlin moth was destined to make apple production an utter impossibility. The chemist, the entymologist, and the scientist combined have not only exploded this belief, but have given us—with the help of the engineer—machinery and formulas which have enabled the business to develop to its present dimensions in a very few years. It would seem, therefore, that we are at least not retreating in regard to our warfare on the pests and diseases which trouble our trees and fruit, but, nevertheless, endless care and watchfulness are necessary to success, which means, of course, endless expense of time and money.

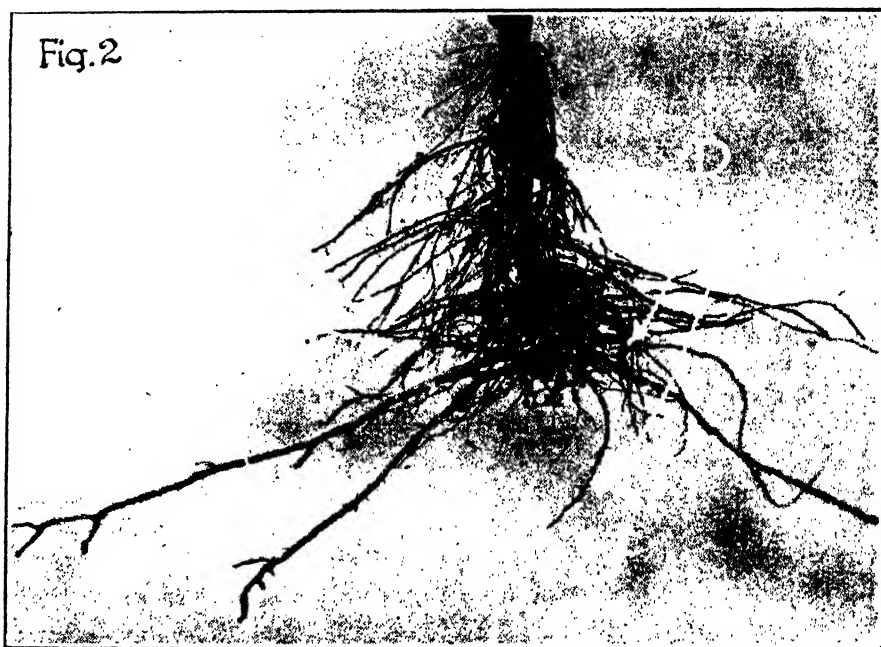
To recuperate this time and money by putting the fruit on an unprotected market overseas in competition with fruit from all over the world is quite a problem, and the net returns from apple culture during the past few years have diminished very considerably.

The query then arises, "How are we to continue fighting these pests and continue to make a profit, especially if, as I have already stated, the pests are likely to increase rather than diminish?" The answer is, "Produce more apples from the same areas under cultivation," and this brings me to the real aim of this paper. I am quite aware that under certain conditions increased crop production, as regards apples, may be affected by varying our pruning methods by better cultivation in dry years, &c., but it is not my intention to dwell on these matters, but to suggest some avenues of investigation which I consider well worthy of very deep and careful consideration, in view of the facts which I have so far collected.

The problem of the "off" year in apple growing, in this State at any rate, is a very real one, and innumerable theories relating to pruning, &c., have been brought forward, but we are still under the influence of the alternation of the good and bad season, which during recent years have been most regular, and which have resulted in little or no export surplus every other season. That this is no good to any business needs no emphasis, especially when it is considered that we have recently adopted distinctive labels for our State, and the majority of the South Australian fruit is readily and easily distinguishable on the overseas market, and, I am glad to say, is making a very real name for itself as regards to quality. It will be very apparent



that this reputation will be very seriously discounted if we cannot keep up a continuity of supplies. Let us look at it from the buyer's point of view. Suppose we, as fruit-growers, purchased an excellent brand of spray which gave us eminent satisfaction for a specific disease, we would naturally turn to that particular brand every year; but if we found that we could only get it every two years, then, rather than keep changing over, we would adopt another line, the best possible which would give us a continuity of service. This is exactly what is happening over the other side with regard to our apples. It will then be apparent that for the time being it will probably pay us to study this problem of "off" seasons very carefully, and leave no likely avenue of investigation unexplored. The necessity for continuity of cropping is realised by practically all orchardists, and in numerous cases the practice of burning off the blooms is resorted to. This, to my mind, is a very extreme measure, and, apart from possible injury to the trees, is very evidently fundamentally wrong, because it still gives an entirely off season to the treated trees, and does not supply continuity.



**Before Manurial Treatment.**

During my experience as a nurseryman, which extends over a period of 25 years, during which time I have almost exclusively specialised in the propagation of deciduous trees only, I have had an opportunity of studying the natural habits of trees during the whole year through, and in quite recent years since concentrated nitrogenous manures have been procurable for stimulating growth, some remarkable facts have made themselves apparent, and it is to these that I wish to draw attention.

Some few years ago I found that an application of nitrogenous manures would, under certain conditions and given enough moisture, stimulate root growth as early as the end of May. That apple roots are not dormant for more than about three weeks during any normal season has been common knowledge for years, and although underground growth is apparent in mid-June on nursery stock, and also on bearing trees, the growth is, under ordinary conditions, small and insignificant. Bearing this in mind, I have tried dressing the orchard with nitrogenous manure during May, and



whether the manure was responsible or not I am not able to state, but the fact remains that the "off" season was not by any means bare and quite a nice picking of fruit resulted. This has happened for two "off" seasons in succession (twice in four years). It would seem that if the root system of an apple can be so stimulated in May as to make rapid growth, the vitality so collected must go into the buds, there being no leaves to absorb any of the sap, and that this is so is borne out by my experience. This brings us to a critical point which I am quite unable to answer—"When does an apple bud finally decide to produce fruit or leaves, as the case may be." This should be the first avenue of investigation in this vast question, and no doubt can be solved.

However, to continue with some of my investigations. This season, on the 20th of May, I dressed a patch of yearling nursery stock with about 3cwt. of sulphate of ammonia to the acre. The result was phenomenal, and by the end of June a mat of



After Manurial Treatment.

young growth was visible, and some of the young rootlets, which were quite white and as tender as possible were over 7in. in length. I would also like to point out that there was practically no rain during the period mentioned, although, of course, in our district there is always a certain amount of moisture available.

The usual practice with regard to the application of nitrogenous manures is to apply same in the early spring. This will help the fruit as regards size and possibly color, stimulate the tree, and enable it to carry its crop without suffering too much. The latter is very necessary to successful apple culture; nevertheless, to my mind, it is essentially and completely utilised on the fruit and foliage being produced at the time of application, as it is a quick acting manure. I do not wish for one moment to decry this practice of spring manuring, but, on the other hand, cannot too highly recommend it. Is it possible that we have taken things too much for granted in this connection, and expect a prolonged service which we will never get from one application of nitrogenous manure?



Having proved beyond question that root development on apple trees can be stimulated into very active operation during autumn by artificial means, it would seem to me that this growth must perforce assist bud development which takes place during the late autumn and winter months. Whether it can be made to assist bud development to the extent of producing fruit in the following year, I cannot definitely state, but this paper is written to ventilate the matter, and, personally, I think that there is, right here, an avenue of investigation which should not be ignored. I have very little doubt but that the crops of the ensuing year can more or less be affected by the application of the right manure during the autumn.

It would appear, therefore, that at least two points could and should be solved; firstly, the actual time of the season when apple buds turn to fruit buds or leaf buds, as the case may be, and secondly, the definite effect of heavy dressings of nitrogenous manures during autumn in the most important apple districts of this State. It would be necessary to extend these operations into several districts, and not confine them to any one area. Knowing only too well what it means to grow apples for a living, I have no hesitation in stating that the job is certainly not one for the individual grower, because the necessary time is not at his disposal, but as any investigation which might tend to increase or improve our output is vital to the State's welfare, I think that our Government might very well be asked to undertake investigations in this connection.

It was essential for the grower to seek the assistance of the scientist in the conquest of the codlin moth and other diseases, because unassisted the grower was doomed to failure. Similarly we must now appeal to the scientific worker to help us solve the greatest problem, we, as apple growers, have to face at the present time.

#### SOME OTHER AVENUES OF INVESTIGATION.

The systematic thinning both of spur wood, cluster buds after bud formation and fruit after setting, especially the latter, should be tried out thoroughly. I am of the opinion that great good may result from a heavy thinning of fruit when an excessive crop has set, and the advantage of this avenue of control would be very definite, although, possibly, costly as far as the actual labor is concerned. Providing the fruit is thinned at any time up to the period when the young fruits are as large as cherries, I feel certain that some measure of relief with regard to the off season would result. That this is so is borne out by the fact that this method of control is extensively practised by some of the leading orchardists of the Commonwealth. One of the largest growers of Western Australia, considers thinning to be one of the season's operations of just as much importance as pruning or spraying, and the results obtained from this orchard are positively astounding with regard to regularity of cropping. Then there is the matter of stock relationship to the tree. In Australia we have adopted the Northern Spy root stock almost entirely for the basis of our commercial orchards because of this stock's immunity from woolly aphis, and because of its thrifty habits and general hardihood, but as to its actual effect upon the tree itself we know nothing. As a fruiting tree, however, the Northern Spy is notoriously shy until matured in years and then is given to alternate cropping. Whether working an intermediate variety between the Spy and the tree itself would help us in solving this problem of off seasons I do not know, but certainly think it is an avenue worth exploring. That, under certain conditions, the stock has a very definite effect upon the tree, and that some of the characteristics of the former are transmitted to the latter is an established fact. An examination of the Cherry section of the stock testing experiments which have been conducted at Blackwood will prove that the stock transmits some of its characteristics to the tops with regard to growth, &c., and no doubt the crop records show that there is a great variance in crop results from



one variety on the several stocks under test. I have previously mentioned the matter of working an intermediate variety between the stock and the tree itself, and just to prove how a small intermediate variety will affect the top I will quote the instance of certain varieties of pears which will not unite with the quince stock. As most of you are aware, the cropping qualities of some pears are re-stimulated considerably by placing same on quince stock, and this stock is used extensively for these varieties. Amongst those in this class is the Glou Morceau, which in some districts is notoriously shy on pear root, but crops heavily and regularly on quince root. Now if we take a Duchess Pear and endeavor to propagate direct on to the quince, failure will result, as the tree will die within a few years. However, if we place a Duchess bud into a Glou Morceau tree, which is on a quince root, the Duchess will thrive even if, after cutting the Glou Morceau away to the bud of the Duchess, there is only an inch of Glou Morceau wood left, this will suffice to enable the Duchess to thrive and live to a ripe old age. I mention this merely to stress the influence of stock and intermediate varieties and to urge experimental work in this direction.

The above mentioned are avenues which so far have not been exploited to any extent whatever, and, if it will not be considered presumption on my part, might I be permitted to make the following suggestion:—As certain of the sections of the Blackwood Orchard will perforce cease to be of value for any purpose whatever very shortly, as they have just about completed their natural life, namely Peaches, some of the Plums and Apricots, could not the ground which these will vacate be used for carrying on some of the tests outlined here? The necessary land, plant, and equipment to a large extent is available. I consider that the good work already done at Blackwood could be still further augmented to the betterment of the industry generally.

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# NINTH ANNUAL REPORT OF THE TURRETFIELD DEMONSTRATION FARM (1929-30), INCLUDING DE- TAILED ANALYSIS OF MEAN FARMING COSTS (1921-30).

[By ARTHUR J. PERKINS, Director of Agriculture.]

(Continued from page 342).

## WHEAT GROWING COSTS AT TURRETFIELD.

### A. WHEAT SOWN ON BARE FALLOW.

Essentially the farmer is interested in Wheat Growing Costs from the standpoint of Costs per Bushel; the latter, on the other hand, are dominated, in the main, by the mean yields per acre obtained in any given season. These mean yields are controlled by three factors, namely:—

- a. The special characteristics of the soil;
- b. Seasonal conditions; and
- c. The relative skill or good fortune of the farmer in making the most of these conditions in any given season.

In the tables that follow, wheat growing costs incurred have been indicated on both a per acre and per bushel basis, and, as will be seen in the summarised statement of Table XI., whereas variations in Costs per acre above or below the normal mean are relatively slight, they are very pronounced in the matter of Costs per Bushel.

TABLE XI.—*Summarising Per Acre and Per Bushel Costs of Growing Wheat sown on Bare Fallow over eight consecutive seasons.*

| Seasons.           | Areas<br>Harvested.<br>Acres. | Mean Yield<br>per Acre.<br>Bush. | Mean Costs.          |                      |
|--------------------|-------------------------------|----------------------------------|----------------------|----------------------|
|                    |                               |                                  | Per Acre.<br>£ s. d. | Per Bushel.<br>s. d. |
| 1922-23 .....      | 202.53                        | 15.08                            | 4 1 7                | 5 5                  |
| 1923-24 .....      | 144.08                        | 9.93                             | 4 6 4                | 8 8                  |
| 1924-25 .....      | 349.32                        | 23.91                            | 4 11 1               | 3 10                 |
| 1925-26 .....      | 260.22                        | 23.42                            | 4 19 2               | 4 3                  |
| 1926-27 .....      | 369.06                        | 19.33                            | 4 14 7               | 4 11                 |
| 1927-28 .....      | 293.18                        | 21.27                            | 5 7 10               | 5 1                  |
| 1928-29 .....      | 407.56                        | 18.38                            | 5 1 6                | 5 6                  |
| 1929-30 .....      | 186.67                        | 17.47                            | 4 0 8                | 4 7                  |
| 1922-30 means .... | 276.58                        | 19.46                            | 4 14 8               | 4 10                 |

These figures make instructive reading with Wheat at 2s. a bushel at country railway sidings. Not even in our most favorable season—1924-25—when the mean yield from 350 acres was approximately 24bush. per acre, would present prices have balanced costs of production at Turretfield, which were 3s. 10d. per Bushel on the farm, or, say, 4s. delivered at the Railway siding. Actually, however, over the eight consecutive seasons mean costs incurred have been at the rate of 4s. 10d. a bushel for a 19½bush. Harvest. In this connection, the Manager is to be congratulated on the fact that in the 1929-30 Season mean Costs per Acre were reduced to £4 0s. 8d. per acre, the lowest figure in the whole series. Costs per bushel were naturally conditioned by the mean yield per acre



—17½bush.—and reached 4s. 7d. per bushel, which compares more than favorably with 5s. 5d. for a 15bush. Harvest in 1922-23.

The influence of Mean Yields per Acre on Costs of Production per Bushel may be illustrated by the following points:—

1. Over eight consecutive seasons mean Wheat yields per acre varied from 9.93bush. to 23.91bush., with a general mean for the eight seasons of 19.46bush. Hence variations in yearly mean yields took place within a range of 22.9 per cent. above the mean of the eight seasons and 49.0 per cent. below it.

2. Over the same period Mean costs per acre of growing Wheat varied from £4 0s. 8d. to £5 7s. 10d., with a general mean for the eight seasons of £4 14s. 8d. Hence, yearly variations were within a range of 13.9 per cent. above the mean of the eight seasons and 14.8 per cent. below it.

3. Finally, over the same period Costs per Bushel varied from 3s. 10d. to 8s. 8d.; hence yearly variations were within the wide range of 79.3 per cent. above the mean of the eight seasons and 20.7 per cent. below it.

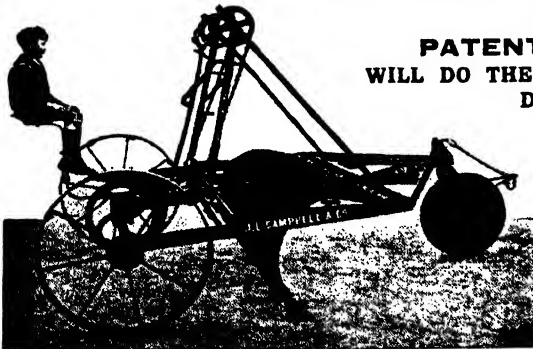
As I shall have occasion to show later on, the good farmer is powerless to control costs of production, apart from his skill to make the most of what opportunities the season happens to offer; and the facts summarised above would appear to stress the fact that one of the most obvious means of meeting rising costs of production is to aim at maximum yields that circumstances permit of. It is, of course, true that seasonal factors are usually at the back of both lean and bountiful harvests, and that the farmer is no more able to control them than he is able to control the unseen economic forces which cripple his best efforts. Ultimately, however, the success of the year's operations is very closely related to the extent to which the farmer adheres to those practices which experience has taught him to be best adapted to the district in which he is placed, and on this adherence will depend the mean yield which he garners in at harvest time.

In Table XII. below I have summarised in detail the main items entering into the costs of growing Wheat at Turretfield. This Table consists of three parts: in the first part actual costs incurred in growing and harvesting 186.67 acres of Wheat in 1929-30 have been analysed in close detail. The respective percentages of the items have also been indicated in contrast with corresponding mean percentages for the 1922-29 and 1922-30 periods. In the second part of the Table the figures have been calculated on a per acre basis, and in the third on a per bushel basis, for the 1922-29 and 1922-30 periods respectively only.

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TABLE XII. —Detailed Analysis of 1929-30 Costs of Wheat on Bare Fallow, together with Mean Per Acre and Per Bushel costs for 1922-29 and 1922-30 periods respectively—continued.

PART II.—Mean Costs per Acre in 1922-29 and 1922-30.

|                                   | 1922-30 Mean Costs. |                  |                      | Material, &c.<br>s. d. | Totals.           |                   |
|-----------------------------------|---------------------|------------------|----------------------|------------------------|-------------------|-------------------|
|                                   | Labor.<br>s. d.     | Horses.<br>s. d. | Implements.<br>s. d. |                        | 1922-30.<br>s. d. | 1922-29.<br>s. d. |
| Tillage of Fallows .....          | 4 9-1               | 12 6-8           | 2 5-0                | —                      | 19 8-9            | 19 11-8           |
| Seeding Operations .....          | 1 10-4              | 3 10-4           | 1 2-5                | —                      | 6 11-3            | 7 1-6             |
| Superphosphate .....              | 0 2-6               | 0 2-8            | 0 0-2                | 6 5-2                  | 6 10-8            | 7 1-0             |
| Seed .....                        | 0 7-2               | 0 0-2            | 0 0-9                | 8 9-8                  | 9 6-1             | 9 8-7             |
| Totals .....                      | 2 8-2               | 4 1-4            | 1 3-6                | 15 3-0                 | 23 4-2            | 23 11-3           |
| Spring Tillage .....              | 0 0-9               | 0 1-1            | 0 0-2                | —                      | 0 2-2             | 0 2-1             |
| Harvest Operations .....          | 3 8-3               | 3 3-1            | 3 8-1                | —                      | 10 7-5            | 10 8-9            |
| Bags .....                        | 0 2-0               | 0 0-2            | —                    | 5 9-8                  | 6 0-0             | 6 2-1             |
| Sewing Twine .....                | —                   | —                | —                    | 0 1-1                  | 0 1-1             | 0 1-0             |
| Totals .....                      | 3 10-3              | 3 3-3            | 3 8-1                | 5 10-9                 | 16 8-6            | 17 0              |
| Unallotted Expenditure .....      | 6 9-4               | 0 3-3            | 0 5-1                | 3 6-0                  | 10 11-8           | 11 0-5            |
| Rates and Taxes .....             | —                   | —                | —                    | 0 7-5                  | 0 7-5             | 0 7-4             |
| Rent (18 months) .....            | —                   | —                | —                    | 16 0-3                 | 16 0-3            | 16 0-6            |
| Interest on Working Capital ..... | —                   | —                | —                    | 7 0-9                  | 7 0-9             | 7 2-3             |
| Totals .....                      | 6 9-4               | 0 3-3            | 0 5-1                | 27 2-7                 | 34 8-5            | 34 10-8           |
| Grand Totals—                     |                     |                  |                      |                        |                   |                   |
| 1922-30 .....                     | 18 1-9              | 20 3-9           | 7 10-0               | 48 4-6                 | 94 8-4            | —                 |
| 1922-29 .....                     | 18 5-1              | 20 7-1           | 8 0-3                | 48 11-5                | —                 | 96 0              |



TABLE XII.—Detailed Analysis of 1929-30 Costs of Wheat on Bare Fallow, together with Mean Per Acre and Per Bushel costs for 1922-29 and 1922-30 periods respectively—continued.

PART III.—Mean Costs Per Bushel.

|                                   | 1922-30 Mean Costs. |         |             | Material, &c. | Totals.        |                |
|-----------------------------------|---------------------|---------|-------------|---------------|----------------|----------------|
|                                   | Labor.              | Horses. | Implements. |               | 1922-30.       | 1922-29.       |
|                                   | s. d.               | s. d.   | s. d.       | s. d.         | s. d.          | s. d.          |
| Tillage of Fallows .....          | 0 2-9               | 0 7-8   | 0 1-5       | —             | 1 0-2          | 1 0-2          |
| Seeding Operations .....          | 0 1-2               | 0 2-4   | 0 0-7       | —             | 0 4-3          | 0 4-4          |
| Superphosphate .....              | 0 0-1               | 0 0-1   | —           | 0 4-0         | 0 4-2          | 0 4-3          |
| Seed .....                        | 0 0-4               | —       | 0 0-1       | 0 5-4         | 0 5-9          | 0 5-9          |
| Totals .....                      | 0 1-7               | 0 2-5   | 0 0-8       | 0 9-4         | 1 2-4          | 1 2-6          |
| Spring Tillage .....              | —                   | 0 0-1   | —           | —             | 0 0-1          | 0 0-1          |
| Harvest Operations .....          | 0 2-3               | 0 2-0   | 0 2-2       | —             | 0 6-5          | 0 6-6          |
| Bags .....                        | 0 0-1               | —       | —           | 0 3-6         | 0 3-7          | 0 3-8          |
| Sowing Twine .....                | —                   | —       | —           | 0 0-1         | 0 0-1          | 0 0-1          |
| Totals .....                      | 0 2-4               | 0 2-0   | 0 2-2       | 0 3-7         | 0 10-3         | 0 10-5         |
| Unallotted Expenditure .....      | 0 4-2               | 0 0-2   | 0 0-3       | 0 2-1         | 0 6-8          | 0 6-7          |
| Rates and Taxes .....             | —                   | —       | —           | 0 0-4         | 0 0-4          | 0 0-4          |
| Rent (18 months) .....            | —                   | —       | —           | 0 9-9         | 0 9-9          | 0 9-8          |
| Interest on Working Capital ..... | —                   | —       | —           | 0 4-3         | 0 4-3          | 0 4-3          |
| Totals .....                      | 0 4-2               | 0 0-2   | 0 0-3       | 1 4-7         | 1 9-4          | 1 9-2          |
| Grand Totals—                     |                     |         |             |               |                |                |
| 1922-30 .....                     | 0 11-2              | 1 0-6   | 0 4-8       | 2 5-8         | 4 10-4         | —              |
| 1922-29 .....                     | 0 11-3              | 1 0-6   | 0 4-9       | 2 5-8         | —              | 4 10-6         |
| Mean Yields per Acre .....        | —                   | —       | —           | —             | Bush.<br>19-46 | Bush.<br>19-64 |



The detailed items of Mean Costs Per Acre and Per Bushel incurred in the 1922-30 period admit of being summarised for purposes of discussion under the following headings:—

TABLE XIII.—*Summarising Mean Costs of Growing Wheat at Turretfield during eight successive seasons (1922-30) during the course of which the mean yield per acre was 19.46bush.*

## STATEMENT "A."

|                                            | Mean Costs Incurred. |             |              |
|--------------------------------------------|----------------------|-------------|--------------|
|                                            | Per Acre.            | Per Bushel. | Percentage.  |
|                                            | £ s. d.              | s. d.       |              |
| Preparation of Fallows to March 31st ..... | 0 19 9               | 1 0         | 20.8         |
| Seeding Operations .....                   | 1 3 4                | 1 2         | 24.7         |
| Harvest Operations .....                   | 0 16 9               | 0 10        | 17.7         |
| Incidental Expenditure .....               | 0 11 9               | 0 8         | 12.5         |
| Interest on Working Capital ...            | 0 7 1                | 0 4         | 7.4          |
| Rent (18 months) .....                     | 0 16 0               | 0 10        | 16.9         |
| Inclusive Costs .....                      | <u>4 14 8</u>        | <u>4 10</u> | <u>100.0</u> |

## STATEMENT "B."

|                                  | Mean Costs Incurred. |             |              |
|----------------------------------|----------------------|-------------|--------------|
|                                  | Per Acre.            | Per Bushel. | Percentage.  |
|                                  | £ s. d.              | s. d.       |              |
| Labor (direct and indirect) .... | 1 3 8                | 1 3         | 25.0         |
| Use of Horses .....              | 0 16 6               | 0 9         | 17.4         |
| Use of Implements .....          | 0 6 2                | 0 4         | 6.5          |
| Seed .....                       | 0 8 10               | 0 5         | 9.4          |
| Purchase of Essential Material.. | 0 12 4               | 0 8         | 13.0         |
| Incidentals .....                | 0 4 1                | 0 3         | 4.4          |
| Interest on Working Capital....  | 0 7 1                | 0 4         | 7.4          |
| Rent (18 months) .....           | 0 16 0               | 0 10        | 16.9         |
| Inclusive Costs .....            | <u>4 14 8</u>        | <u>4 10</u> | <u>100.0</u> |

## STATEMENT "C."

|                                                     | Mean Costs Incurred. |             |              |
|-----------------------------------------------------|----------------------|-------------|--------------|
|                                                     | Per Acre.            | Per Bushel. | Percentage.  |
|                                                     | £ s. d.              | s. d.       |              |
| Interest on Land and Improvements .....             | 0 16 0               | 0 10        | 16.9         |
| Interest on Working Capital....                     | 0 7 1                | 0 4         | 7.4          |
| Depreciation on Improvements and Plant .....        | 0 9 0                | 0 6         | 9.5          |
| Labor (exclusive of depreciation on quarters) ..... | 1 2 9                | 1 2         | 24.1         |
| Purchase of Essential Material..                    | 0 12 4               | 0 8         | 13.0         |
| All Other Costs .....                               | 1 7 6                | 1 4         | 29.1         |
| Inclusive Costs .....                               | <u>4 14 8</u>        | <u>4 10</u> | <u>100.0</u> |

From the above statements it will be noted that over a period of eight successive seasons mean inclusive Costs of growing Wheat at Turretfield have been represented by £4 14s. 8d. per acre, or 4s. 10d. a bushel for a 19.46bush. harvest. In the absence of any other authoritative statement as to costs actually incurred in growing Wheat in Australia, these figures have received special attention within recent times, and particularly so since the calamitous fall in the price of Wheat. If it costs 4s. 10d. a bushel to grow a 19.46bush. crop, how can farmers be expected to continue on the land with Wheat at 2s. a bushel and the State mean yield at 10bush. to 12bush. per Acre? In the circumstances, and in order to obviate a possible misuse of the Turretfield figures, I propose stressing here what they actually represent, and what conclusions can legitimately be drawn from them of State-wide relevancy.



In the first place, economic conditions obtaining at Turretfield are very far from typical of corresponding conditions on the average Australian Farm. The Turretfield Farm is managed by a paid Manager and all manual operations of the farm are carried out by hired labor, paid at the standard rate of wages. These conditions correspond to those obtaining on Station property owned by a Company and worked by a hired Staff, but not to those obtaining on the average Australian Farm. The latter is usually managed by the owner, and in the majority of cases farm manual operations are carried out almost entirely by the owner and his family; in exceptional cases only 25 per cent. to 50 per cent. of the manual operations might fall to hired Labor.

Another difficulty already referred to earlier in this report (see page 337 of November issue of the *Journal of Agriculture*) is the fact that in these accounts Turretfield is assumed to be a leased property upon which regular annual rent is paid, the value of which is distributed among the various accounts concerned. Most South Australian Farms are freehold properties, or Crown Leases on a covenant to purchase, completion of which extends over a long period of years. In such circumstances, charges for rent, or what corresponds to the same thing, interest on Capital invested in land, would be correspondingly lower on the average farm than at Turretfield. Similar in nature is the fact that the money value of Turretfield land is higher than that of the average South Australian freehold Wheat Farm.

Again, the soil of the Turretfield Farm is exceptionally heavy, and as such is relatively costly to till; hence the cost of Tillage Operations on the average Mallee Farm will be considerably less than the Turretfield mean figure of 19s. 9d. per acre.

And, finally, at Turretfield Wheat Growing is associated with a Fat Lamb Flock of Sheep, which as a rule grazes over the equivalent of one-half of the area of the farm. It follows, therefore, that at Turretfield the Wheat crop is relieved of a considerable proportion of the rental value of the land, whereas on a farm on which Working Horses and the family cow only had access to available grazing areas, the year's Wheat Crop would have to carry the full cost of the rental value of the whole farm.

The above difficulties represent the main reasons why the Turretfield figures cannot safely be assumed to have State-wide significance, except subject to limiting reserves, even on the basis of costs per acre; and when costs per bushel are in question, differences in mean yields complicate the position still further. Bearing in mind these difficulties, let us examine what conclusions of value we may derive from the figures.

In the three Statements of Table XIII., I have described those costs as "Inclusive Costs," i.e., every item has been debited against the Wheat Crop that legitimate accounting permits of. In this connection it should be pointed out that this practice is not altogether in keeping with the views of the majority of English Economists, who apparently would exclude from Costs of production interest on the Farmer's Capital, unpaid family Labor, &c. These views, which I cannot accept as legitimate, would reduce the cost of growing Wheat at Turretfield to 4s. 6d. to a tenant-farmer with a paid Staff, or to 3s. 3d. if he used no hired labor; corresponding figures for a farmer-owner would be 3s. 8d. and 2s. 5d. respectively.

Statement A shows that in these "Inclusive" Costs, purely field operations—i.e., preparation of the land, seeding and harvest operations—are represented by 63.2 per cent. only of the expenditure, namely, £2 19s. 10d. per acre, or 3s. per bushel. The Balance—£1 14s. 10d. per acre, or 1s. 10d. per bushel—is absorbed by general expenses, interest on Capital, and Rent.

Statement B, on the other hand, shows the value of Hired Labor both directly or indirectly concerned in the growing of Wheat to have been 23s. 8d. per acre, or 1s. 3d. per bushel, or, again, 25 per cent. of the inclusive costs. From the standpoint of a farmer and family wholly responsible for management and manual operations, a charge of 1s. 3d. per bushel for Labor, would imply, with Wheat at 4s. 10d., that the farmer and family would be receiving payment for their Labor from a 19.46bush. harvest at the rate of 23s. 8d. for every acre harvested, or at 1s. 3d. for every bushel reaped.



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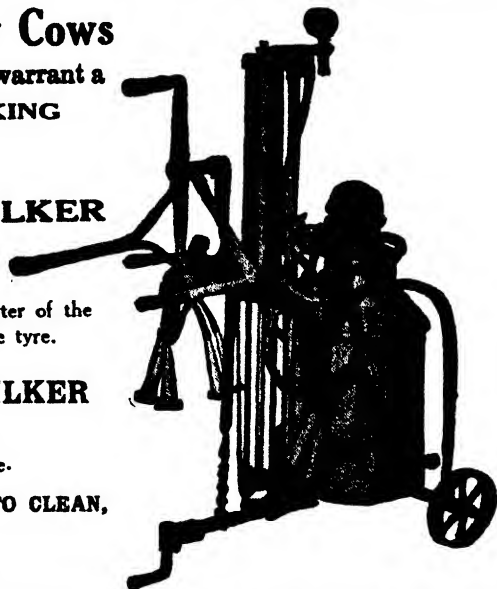
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Let us assume, by way of a concrete example, that a Farmer and Family reaped 19.46 bush. per acre from 300 acres of Wheat; on the Turretfield basis inclusive costs would have been represented by £1,420. If we assume, further, that the Wheat realised on sale £1,420, i.e., costs of production on the farm, although the year's transactions would have ended without any Net Profits, the farmer and family would have earned for their Labor £355, plus £346 representing interest on Capital. These assumptions imply, however, that the Wheat should have sold at 4s. 10d. per Bushel on the farm: but with Wheat at 2s. no interest could be paid on Capital engaged; no provision could be made for depreciation on improvements and plant; no payment would be received for a year's toil; the 2s. would, in fact, do no more than meet the costs of the purchase of essential material, rates and taxes, and other incidental expenditure.

Such, therefore, would be the unenviable position of the farmer working a Wheat Farm under Turretfield conditions in the current season; and it is to be feared that the plight of the man working on cheaper and more easily worked land is not much better because of normally lower yields.

Turretfield mean Costs of Production have been given as £4 14s. 8d. per acre for a 19.46bush. harvest; if we reduce these charges to £3 an acre, the cost per Bushel would still be 5s. for a 12bush. average; and even if we deduct 15s. for labor costs, £2 5s. would represent 3s. 9d. a bushel, a figure close on double the price at present offering for Wheat.

In Statement B, Labor (direct and indirect) is given as £1 3s. 8d. per acre; this figure includes, in addition to ordinary field labor (direct), a certain amount of Labor included in values given elsewhere for use of Horses and Implements (indirect labor). Details concerning mean direct and indirect labor for the 1922-30 period are shown below:—

|                                                                                               | Per Acre. | Per Bushel. | Percentage of<br>Mean Inclusive<br>Costs. |
|-----------------------------------------------------------------------------------------------|-----------|-------------|-------------------------------------------|
|                                                                                               | s. d.     | s. d.       | %                                         |
| Direct Field labor .....                                                                      | 18 2      | 0 11.2      | 19.2                                      |
| Indirect labor (use of horses) .....                                                          | 3 10      | 0 2.4       | 4.0                                       |
| Indirect labor (use of implements) .....                                                      | 1 8       | 0 1.0       | 1.8                                       |
| Total mean value of labor, direct and<br>indirect, concerned in the growing of<br>wheat ..... | 23 8      | 1 2.6       | 25.0                                      |

The mean rate of payment of Labor at Turretfield has been at the rate of 1s. 4.23d. per hour, and it is therefore possible to determine the number of hours of work involved in Wheat growing from costs recorded in the various accounts. These have been summarised in the statement below:—

*Summarising number of Working Hours per Acre involved in Wheat  
Growing (1922-30 Means).*

|                             | Costs. | Corresponding<br>Hours. |
|-----------------------------|--------|-------------------------|
|                             | s. d.  | Hours.                  |
| Direct labor—               |        |                         |
| Tillage of fallows .....    | 4 9    | 3.52                    |
| Seeding operations .....    | 2 8    | 1.98                    |
| Spring Tillage .....        | 0 1    | 0.06                    |
| Harvest Operations .....    | 3 10   | 2.85                    |
| General Expenses .....      | 6 10   | 5.02                    |
|                             | 18 2   | 13.43                   |
| Indirect Labor .....        | 5 6    | 4.07                    |
| Inclusive Labor Costs ..... | 23 8   | 17.5                    |



Thus, then, at Turretfield in the growing of Wheat on Bare Fallow  $17\frac{1}{2}$  hours labor per acre spread over 18 months have represented inclusive requirements over a period of eight successive seasons; and as the average working day on the farm has been  $9\frac{1}{2}$  hours, this represents 1.84 days per acre. Further, if we assume 307 to be the working days in a calendar year, one man could be responsible for 167 acres of Wheat under Turretfield conditions.

Finally, it remains to be stated that the expenses of the Wheat Grower do not end with the Harvesting of his grain. He has still to deliver it to market before accounts can be definitely closed. This additional item of expenditure will naturally vary with the distance of the farm from places of delivery, the condition of the roads, etc. According to circumstances, Wheat at Turretfield has been delivered to market by our own teams, or by the teams of contractors. Costs of delivery by our own teams of 7,354bush. over several seasons have been as follows:—

|                                         | Total. |       | Costs Involved. |     |
|-----------------------------------------|--------|-------|-----------------|-----|
|                                         | £      | s. d. | Per Bushel.     |     |
|                                         |        |       | d.              |     |
| Labor .....                             | 50     | 10 7  | 0               | 1-6 |
| Use of Horses .....                     | 47     | 11 4  | 0               | 1-6 |
| Use of Implements .....                 | 2      | 19 9  | 0               | 0-1 |
| Sundries.....                           | 0      | 12 7  | —               | —   |
| Cost of conveying Wheat to Market ..... | 101    | 14 3  | 0               | 3-3 |

In 1927-28 Wheat was delivered by contract at 2.24d. per Bushel (5,624bush); in 1928-29 at 1.93d. (5,567bush); and in 1929-30 at 1.5d. per bushel (7,554bush). If we average out costs incurred by the farm in earlier years and contract costs of the past three years, we get a mean rate of 2.26d. per Bushel representing costs of conveying Wheat from the farm to usual places of delivery.

Hence, the mean inclusive cost of growing and delivering to market a 19.46bush. harvest of Wheat has been represented at Turretfield by 5s. 0½d. per bushel.

#### B. WHEAT SOWN ON PEA STUBBLES.

During the past four seasons small areas of pea stubble land—34.9, 34.5, 44.08, and 19.42 acres respectively—have been sown to Wheat and subsequently harvested for grain. Expenditure connected herewith has been analysed in Table XIV.

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TABLE XIV.—Analysis of Expenditure incurred in Growing Wheat on Pea Stubbles in 1929-30 and in the 1926-30 Mean Period.

PART I.—Expenditure incurred on 19.42 Acres (1929-30).

|                                   | Labor. |    |   | Horses. |    |    | 1929-30 Expenditure. |    |   | Totals. |    |    | Percentages. |          |          |       |
|-----------------------------------|--------|----|---|---------|----|----|----------------------|----|---|---------|----|----|--------------|----------|----------|-------|
|                                   | £      | s  | d | £       | s  | d  | £                    | s  | d | £       | s  | d  | 1929-30.     | 1928-29. | 1928-30. |       |
| Preparation of Land .....         | 2      | 6  | 7 | 3       | 11 | 6  | 0                    | 17 | 5 | —       | 6  | 15 | 6            | 12.4     | 12.2     | 12.2  |
| Seeding operations .....          | 2      | 2  | 7 | 3       | 6  | 3  | 0                    | 13 | 9 | —       | 6  | 2  | 7            | 11.2     | 8.4      | 8.7   |
| Superphosphate .....              | 0      | 3  | 1 | 0       | 3  | 3  | 0                    | 0  | 2 | 4       | 9  | 6  | 0            | 8.7      | 9.5      | 9.4   |
| Seed.....                         | 0      | 9  | 0 | 0       | 0  | 4  | 0                    | 1  | 8 | 6       | 1  | 6  | 6            | 12.1     | 15.7     | 15.3  |
| Totals .....                      | 2      | 14 | 8 | 3       | 9  | 10 | 0                    | 15 | 7 | 10      | 11 | 0  | 17           | 11       | 1        | 33.4  |
| Spring Tillage .....              | 0      | 12 | 1 | 0       | 13 | 11 | 0                    | 1  | 5 | —       | 1  | 7  | 5            | 2.5      | 0.1      | 0.4   |
| Harvest Operations .....          | 3      | 1  | 0 | 3       | 18 | 9  | 2                    | 17 | 5 | —       | 9  | 17 | 2            | 18.0     | 16.1     | 16.4  |
| Bags .....                        | 0      | 16 | 5 | —       | —  | —  | —                    | —  | — | —       | 0  | 16 | 5            | 1.5      | 6.1      | 5.5   |
| Sewing Twine .....                | —      | —  | — | —       | —  | —  | 0                    | 1  | 3 | 0       | 1  | 3  | 0            | 0.1      | 0.1      | 0.1   |
| Totals .....                      | 3      | 17 | 5 | 3       | 18 | 9  | 2                    | 17 | 5 | 0       | 1  | 3  | 10           | 14       | 10       | 22.0  |
| Unallotted Expenditure .....      | 3      | 0  | 7 | 0       | 3  | 1  | 0                    | 3  | 9 | 3       | 4  | 7  | 6            | 12       | 0        | 11.7  |
| Rates and Taxes .....             | —      | —  | — | —       | —  | —  | 0                    | 13 | 3 | 0       | 13 | 3  | 1.2          | 0.9      | 1.0      | 1.0   |
| Rent (nine months) .....          | —      | —  | — | —       | —  | —  | 7                    | 6  | 5 | 7       | 6  | 5  | 13.4         | 11.3     | 11.5     | 11.5  |
| Interest on Working Capital ..... | —      | —  | — | —       | —  | —  | 3                    | 15 | 0 | 3       | 15 | 0  | 6.8          | 7.9      | 7.8      | 7.8   |
| Totals .....                      | 3      | 0  | 7 | 0       | 3  | 1  | 0                    | 3  | 9 | 14      | 19 | 3  | 18           | 6        | 8        | 32.0  |
| Grand Totals .....                | 12     | 11 | 4 | 11      | 17 | 1  | 4                    | 15 | 7 | 25      | 11 | 6  | 54           | 15       | 6        | 100.0 |
| Percentages—                      |        |    |   |         |    |    |                      |    |   |         |    |    |              |          |          |       |
| 1929-30 .....                     | 23.0   |    |   | 21.6    |    |    | 8.7                  |    |   | 46.7    |    |    |              |          |          |       |
| 1928-29 .....                     | 19.9   |    |   | 16.5    |    |    | 10.0                 |    |   | 53.6    |    |    |              |          |          |       |
| 1928-30 .....                     | 20.3   |    |   | 17.1    |    |    | 9.8                  |    |   | 52.8    |    |    |              |          |          |       |



TABLE XIV.—*Analysis of Expenditure incurred in Growing Wheat on Pra Stubbles in 1929-30 and in the 1926-30 Mean Period—continued.*

PART II.—*Mean Expenditure per Acre (1926-30).*

|                                   | Labor.<br>s. d. | 1926-30 Expenditure. |                      | Material &c.<br>s. d. | Totals.           |                   |
|-----------------------------------|-----------------|----------------------|----------------------|-----------------------|-------------------|-------------------|
|                                   |                 | Horses.<br>s. d.     | Implements.<br>s. d. |                       | 1926-30.<br>s. d. | 1926-29.<br>s. d. |
| Preparation of Land .....         | 2 10-1          | 4 4-5                | 1 0-6                | —                     | 8 3-2             | 8 5-8             |
| Seeding Operations .....          | 1 6-8           | 3 4-1                | 1 0-1                | —                     | 5 11-0            | 5 10-2            |
| Superphosphate .....              | 0 2-8           | 0 2-7                | 0 0-2                | 5 10-2                | 6 3-9             | 6 6-8             |
| Seed .....                        | 0 7-9           | 0 0-3                | 0 1-5                | 9 6-0                 | 10 3-7            | 10 10-9           |
| Totals .....                      | 2 5-5           | 3 7-1                | 1 1-8                | 15 4-2                | 22 6-6            | 23 3-9            |
| Spring Tillage .....              | 0 1-4           | 0 1-6                | 0 0-2                | —                     | 0 3-2             | 0 0-8             |
| Harvest Operations .....          | 3 7-4           | 3 4-1                | 4 1-2                | —                     | 11 0-7            | 11 2-5            |
| Bags .....                        | 0 1-8           | 0 0-1                | —                    | 3 7-0                 | 3 8-9             | 4 2-9             |
| Sewing Twine .....                | —               | —                    | —                    | 0 0-8                 | 0 0-8             | 0 0-8             |
| Totals .....                      | 3 9-2           | 3 4-2                | 4 1-2                | 3 7-8                 | 14 10-4           | 15 6-2            |
| Unallotted Expenditure .....      | 4 6-0           | 0 1-5                | 0 3-8                | 2 11-8                | 7 11-1            | 8 1-5             |
| Rates and Taxes .....             | —               | —                    | —                    | 0 7-7                 | 0 7-7             | 0 7-6             |
| Rent (nine months) .....          | —               | —                    | —                    | 7 9-5                 | 7 9-5             | 7 10-0            |
| Interest on Working Capital ..... | —               | —                    | —                    | 5 3-2                 | 5 3-2             | 5 6-1             |
| Totals .....                      | 4 6-0           | 0 1-5                | 0 3-8                | 16 8-2                | 21 7-5            | 22 1-2            |
| Grand Totals—                     |                 |                      |                      |                       |                   |                   |
| 1926-30 .....                     | 13 8-2          | 11 6-9               | 6 7-6                | 35 8-2                | 67 6-9            | —                 |
| 1926-29 .....                     | 13 9-7          | 11 5-7               | 6 11-1               | 37 3-4                | —                 | 69 5-9            |



TABLE XIV.—*Analysis of Expenditure incurred in Growing Wheat on Pra Stubbles in 1929-30 and in the 1926-30 Mean Period—continued.*PART III.—*Mean Expenditure per Bushel (1926-30).*

|                                   | Labor.<br>s. d. | 1926-30 Horses.<br>s. d. | 1926-30 Expenditure.<br>Implements.<br>s. d. | Material, &c.<br>s. d. | 1926-30.<br>s. d. | Totals.<br>1926-29.<br>s. d. |
|-----------------------------------|-----------------|--------------------------|----------------------------------------------|------------------------|-------------------|------------------------------|
| Preparation of Land .....         | 0 2-1           | 0 3-3                    | 0 0-8                                        | —                      | 0 6-2             | 0 5-9                        |
| Seeding Operations .....          | 0 1-2           | 0 2-5                    | 0 0-8                                        | —                      | 0 4-5             | 0 4-1                        |
| Superphosphate .....              | 0 0-2           | 0 0-2                    | —                                            | 0 4-4                  | 0 4-8             | 0 4-6                        |
| Seed .....                        | 0 0-5           | —                        | 0 0-1                                        | 0 7-1                  | 0 7-7             | 0 7-6                        |
| Totals .....                      | 0 1-9           | 0 2-7                    | 0 0-9                                        | 0 11-5                 | 1 5-0             | 1 4-3                        |
| Spring Tillage .....              | 0 0-1           | 0 0-1                    | —                                            | —                      | 0 0-2             | 0 0-1                        |
| Harvest Operations .....          | 0 2-7           | 0 2-5                    | 0 3-1                                        | —                      | 0 8-3             | 0 7-9                        |
| Bags .....                        | 0 0-1           | —                        | —                                            | 0 2-7                  | 0 2-8             | 0 3-0                        |
| Sewing Twine .....                | —               | —                        | —                                            | 0 0-1                  | 0 0-1             | 0 0-1                        |
| Totals .....                      | 0 2-8           | 0 2-5                    | 0 3-1                                        | 0 2-8                  | 0 11-2            | 0 11-0                       |
| Unallotted Expenditure .....      | 0 3-4           | 0 0-1                    | 0 0-2                                        | 0 2-2                  | 0 5-9             | 0 5-7                        |
| Rates and Taxes .....             | —               | —                        | —                                            | 0 0-5                  | 0 0-5             | 0 0-4                        |
| Rent (nine months) .....          | —               | —                        | —                                            | 0 5-9                  | 0 5-9             | 0 5-5                        |
| Interest on Working Capital ..... | —               | —                        | —                                            | 0 4-0                  | 0 4-0             | 0 3-9                        |
| Totals .....                      | 0 3-4           | 0 0-1                    | 0 0-2                                        | 1 0-6                  | 1 4-3             | 1 3-5                        |
| Grand Totals—                     |                 |                          |                                              |                        |                   |                              |
| 1926-30 .....                     | 0 10-3          | 0 8-7                    | 0 5-0                                        | 2 2-9                  | 4 2-9             | —                            |
| 1926-29 .....                     | 0 9-7           | 0 8-0                    | 0 4-9                                        | 2 2-2                  | —                 | 4 0-8                        |
| Mean Yields per Acre .....        | —               | —                        | —                                            | —                      | Bush.<br>15-94    | Bush.<br>17-10               |



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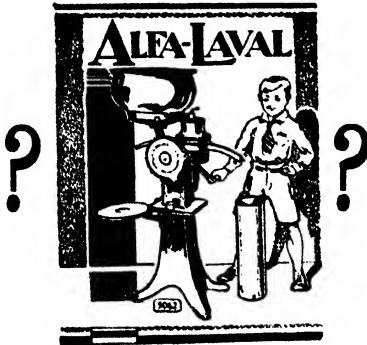
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It should be observed that over a period of four years—1926-30—the mean yield per acre of Wheat grown on Pea Stubbles has been 15.94bush., against 19.2bush. for Wheat grown on Bare Fallow over the same four-year period.

I have summarised below in Table XV. mean expenditure incurred in growing Wheat on Pea Stubbles—1926-30—in comparison with corresponding Mean Expenditure for Wheat grown on Bare Fallow—1922-30.

TABLE XV.—*Contrasting Mean Expenditure incurred for Wheat after Pease with corresponding expenditure for Wheat after Bare Fallow.*

|                                              | Mean Cost of Wheat Grown on<br>Pea Stubbles.<br>(1926-30). |           |             | Mean Cost of Wheat Grown on<br>Bare Fallow.<br>(1922-30). |           |             |
|----------------------------------------------|------------------------------------------------------------|-----------|-------------|-----------------------------------------------------------|-----------|-------------|
|                                              | Per Acre.                                                  | Per Bush. | Percentage. | Per Acre.                                                 | Per Bush. | Percentage. |
| STATEMENT "A."                               |                                                            |           |             |                                                           |           |             |
|                                              | s. d.                                                      | s. d.     | %           | s. d.                                                     | s. d.     | %           |
| Preparation of Land .....                    | 8 3                                                        | 0 6       | 12.2        | 19 9                                                      | 1 0       | 20.8        |
| Seeding Operations .....                     | 22 7                                                       | 1 5       | 33.4        | 23 4                                                      | 1 2       | 24.7        |
| Harvest Operations .....                     | 14 10                                                      | 0 11      | 22.0        | 16 9                                                      | 0 10      | 17.7        |
| Incidental Expenditure....                   | 8 10                                                       | 0 7       | 13.1        | 11 9                                                      | 0 8       | 12.5        |
| Interest on Working                          |                                                            |           |             |                                                           |           |             |
| Capital .....                                | 5 3                                                        | 0 4       | 7.8         | 7 1                                                       | 0 4       | 7.4         |
| Rent (9 and 18 months<br>respectively) ..... | 7 10                                                       | 0 6       | 11.5        | 16 0                                                      | 0 10      | 16.9        |
| Inclusive Costs .....                        | 67 7                                                       | 4 3       | 100.0       | 94 8                                                      | 4 10      | 100.0       |

|                                              |       |       |       |       |       |       |
|----------------------------------------------|-------|-------|-------|-------|-------|-------|
| STATEMENT "B."                               |       |       |       |       |       |       |
|                                              | s. d. | s. d. | %     | s. d. | s. d. | %     |
| Labor (direct and indirect).                 | 17 6  | 1 1   | 25.9  | 23 8  | 1 3   | 25.0  |
| Use of Horses .....                          | 9 5   | 0 7   | 13.9  | 16 6  | 0 9   | 17.4  |
| Use of Implements .....                      | 5 0   | 0 4   | 7.4   | 6 2   | 0 4   | 6.5   |
| Seed .....                                   | 9 6   | 0 7   | 14.1  | 8 10  | 0 5   | 9.4   |
| Purchase of Essential                        |       |       |       |       |       |       |
| Material .....                               | 9 6   | 0 7   | 14.1  | 12 4  | 0 8   | 13.0  |
| Incidentals .....                            | 3 7   | 0 3   | 5.3   | 4 1   | 0 3   | 4.4   |
| Interest on Working                          |       |       |       |       |       |       |
| Capital .....                                | 5 3   | 0 4   | 7.8   | 7 1   | 0 4   | 7.4   |
| Rent (9 and 18 months<br>respectively) ..... | 7 10  | 0 6   | 11.5  | 16 0  | 0 10  | 16.9  |
| Inclusive Costs .....                        | 67 7  | 4 3   | 100.0 | 94 8  | 4 10  | 100.0 |

|                                                                    |       |       |       |       |       |       |
|--------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| STATEMENT "C."                                                     |       |       |       |       |       |       |
|                                                                    | s. d. | s. d. | %     | s. d. | s. d. | %     |
| Interest on Land and<br>Improvements .....                         | 7 10  | 0 6   | 11.5  | 16 0  | 0 10  | 16.9  |
| Interest on Working                                                |       |       |       |       |       |       |
| Capital .....                                                      | 5 3   | 0 4   | 7.8   | 7 1   | 0 4   | 7.4   |
| Depreciation on Improve-<br>ments and Plant .....                  | 8 3   | 0 6   | 12.2  | 9 0   | 0 6   | 9.5   |
| Labor (exclusive of Depre-<br>ciation on Living<br>Quarters) ..... | 16 10 | 1 0   | 24.9  | 22 9  | 1 2   | 24.1  |
| Purchase of Essential                                              |       |       |       |       |       |       |
| Material .....                                                     | 9 6   | 0 7   | 14.1  | 12 4  | 0 8   | 13.0  |
| All other Costs .....                                              | 19 11 | 1 4   | 29.5  | 27 6  | 1 4   | 29.1  |
| Inclusive Costs .....                                              | 67 7  | 4 3   | 100.0 | 94 8  | 4 10  | 100.0 |

Mean yields per acre .....

15.94bush.

19.46bush.



It should be observed that whilst in Table XV. the costs of Wheat sown on Bare Fallow represent the means of eight successive seasons—1922-30—those of Wheat following Pease are the means of four seasons only—1926-30; and that in consequence the latter are perhaps less representative of local conditions than the former. If, however, we overlook this fact, the data show that wheat after Bare Fallow is more costly than Wheat after Pease, namely, 67s. 7d. per acre and 4s. 3d. per bushel, in the latter case, against 94s. 8d. per acre and 4s. 10d. per Bushel in the former. On these figures, Wheat at 4s. 6d. a Bushel would leave a margin of profit if following Pease, but a loss if succeeding Bare Fallow.

The two main items upon which economies are realised are Preparation of the Land and Rent, which aggregate 16s. 1d. per acre, or 1s. a bushel only, for Wheat after Pease, but 35s. 9d. per acre, or 1s. 10d. per Bushel for Wheat sown on Bare Fallow. The whole value of the practice, however, is contingent on a net profit being realised from the preceding Pea Crop; this is a question which will be discussed in another section of the Report.

Finally, we shall consider the number of Working Hours involved in growing Wheat after Pease in contrast with corresponding figures for Wheat after Bare Fallows:—

TABLE XVI.—*Summarising number of Working Hours per Acre involved in Growing Wheat after Pease in contrast with corresponding figures for Wheat after Bare Fallow.*

|                       | Wheat after Pease, 1926-30. |      |               |        | Wheat after Bare Fallow, 1922-30. |      |               |        |      |   |
|-----------------------|-----------------------------|------|---------------|--------|-----------------------------------|------|---------------|--------|------|---|
|                       | Costs at 1s. 4-23d.         |      | Corresponding |        | Costs at 1s. 4-23d.               |      | Corresponding |        |      |   |
|                       | per Hour.                   |      | Hours.        |        | per Hour.                         |      | Hours.        |        |      |   |
|                       | s.                          | d.   | Hours.        | Hours. | s.                                | d.   | Hours.        | Hours. |      |   |
| Direct Labor--        |                             |      |               |        |                                   |      |               |        |      |   |
| Preparation of Land   | 2                           | 10   | —             | 2-10   | —                                 | 4    | 9             | —      | 3-52 | — |
| Seeding Operations .  | 2                           | 6    | —             | 1-82   | —                                 | 2    | 8             | —      | 1-98 | — |
| Spring Tillage.....   | 0                           | 1    | —             | 0-09   | —                                 | 0    | 1             | —      | 0-06 | — |
| Harvest Operations.   | 3                           | 9    | —             | 2-78   | —                                 | 3    | 10            | —      | 2-85 | — |
| General Expenses ..   | 4                           | 6    | —             | 3-33   | —                                 | 6    | 10            | —      | 5-02 | — |
|                       | 13 8                        |      | 10-12         |        | 18 2                              |      | 13-43         |        |      |   |
| Indirect Labor .....  | —                           | 3 10 | —             | 2-82   | —                                 | 5 6  | —             | 4-07   |      |   |
| Inclusive Labor Costs | —                           | 17 6 | —             | 12-94  | —                                 | 23 8 | —             | 17-5   |      |   |

Thus, then, whereas Wheat following Bare Fallow absorbs 17½ hours per acre of Labor, the corresponding figure for Wheat after Pease would be 13 hours only. Reducing these figures to 9½ hour-days, these figures would become 184 days for 100 acres of Wheat sown on Bare Fallow, against 136 days for a corresponding area sown on Pea Stubbles. The comparison cannot be pushed further because obviously Labor absorbed by the Pea Crop must also be taken into consideration, and this will be done when dealing with the Pea Crop.

(To be continued.)

## SUMMER FODDER CROPS

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## SOME PROBLEMS AFFECTING DAIRY FARMING IN SOUTH AUSTRALIA.

[Paper read by Mr. H. B. Barlow, H.D.A., Chief Dairy Instructor, at the Forty-first Annual Congress of the Agricultural Bureau.]

The problems I particularly desire to draw attention to may be divided into two groups:—

- (a) Those affecting production.
- (b) Those affecting manufacture.

Although it may appear to some people that manufacturing has nothing to do with the farmer, this is quite a mistaken impression, since the manufacturer absolutely depends on the quality of the raw product to enable him to make a sound article.

The problems affecting production might be divided as follows:—

- (a) Suitable cattle.
- (b) Economical feeding.

With the knowledge available throughout the world of the productivity of individual cows, it must be accepted that obtaining the right sort of animal is of the utmost importance to successful dairying. What is the best means of obtaining this animal?

Experience shows that it is practically impossible to buy a really good dairy herd, unless under exceptional circumstances and by paying exorbitant prices, and this method can be considered as beyond the means of the average dairyman.

This statement is particularly true at the present time, and is accentuated by the fact that there has developed throughout the last 18 months at least, a strong tendency on the part of the landholders generally, to make dairying a much more important part of their farming operations. The reasons for this decision are not hard to understand.

Both wheat and wool have shown a strong tendency to decline in value, and at the same time, until just lately at least, the value of dairy products has remained at a satisfactory level.

Additionally, farmers generally have been forced into the position of appreciating the value of an income, no matter how small, which could be depended upon as being available each fortnight.

Economically, this is one of the strongest factors in favor of dairying.

Whatever the reason, South Australia at the present time is very short in dairy cows at a profitable age, and at times such as these this is a very serious matter, inasmuch as the demand will tend to force the price of stock too high for profitable working, thus bringing about much the same economic position as has occurred when prices paid for land were too high.

### BREEDING YOUNG STOCK.

The question of making up this shortage in dairy cows is economically very important, and, in my opinion, the only sound and economical method of building up depleted herds is by breeding and rearing young stock. It may possibly be suggested that the breeding of young dairy stock is not a paying proposition from the individual's standpoint, although it would be of advantage to the State generally. To a great extent this viewpoint has been developed, firstly by the opening up of larger milk areas in our Hills districts and the Adelaide Plains, and thereby diminishing the amount of skim milk available for rearing calves; and, secondly, owing to the phenomenally high prices which have been ruling for vealers during the last few years.

The fact that relatively high prices have been procurable for calves six weeks to two months old has been the reason for a very serious drain on our dairy herds.



Admittedly the dry seasons experienced in the Lower and Middle North, coupled with the scarcity of feed, have made the acceptance of this avenue for obtaining a small amount of ready cash very attractive, but the cumulative effect has put us in a more or less serious position. Notwithstanding these facts, I still contend that the breeding and rearing of our own young stock is the only possible way to establish and maintain sound and profitable dairy herds, and the larger the herd the more important does this matter become.

Granted that this policy is acceptable, it is imperative that only a pure-bred bull developed from high producing ancestors should be used if a sure and economical method of improving the production of the herd is required.

In this connection the Government is assisting very generously by subsidising approved bulls, and the progeny of these subsidised bulls are shown—and will continue to show—a marked improvement on the production figures of the State generally.

#### FEEDING.

Since the modern dairy cow is only an animate machine, developed by man, in order that large quantities of crude foodstuffs (pastures, &c.) should be turned into milk for the manufacture of dairy products, the feeding question is of tantamount importance.

Every ounce of milk a cow produces must and can only be procured from the food which the cow consumes, therefore, if a regular supply of milk is required, a regular supply of food must be available.

So far as this State is concerned, excepting perhaps on the irrigation areas of the River Murray, and even there perhaps with advantage, it must be an accepted policy that, at least for a few months each year, dairy cows must have a certain amount of hand feeding if satisfactory returns are to be expected.

This necessity immediately opens up the question as to ways and means.

It is an acknowledged fact that, except in extreme cases, if dairy cows are to be fed economically the feed must be produced on the farm, and the ration the cows are fed must be controlled by the crops which can be grown or stored.

Throughout our Hills and South-East districts, where heavy crops of clover or meadow hay can be grown and cured, the obtaining of the bulk ration is fairly simple. In these same districts this bulk ration can be supplemented with advantage by grain, in the shape of oats, barley, and peas. These grains fed in a crushed form either singly or together, will be found of great assistance when natural pasture is scarce.

Pastures in these areas can also be supplemented by having a small lucerne patch for summer feed, or planting such summer growing crops as Sudan grass or maize, and in the damp gullies cow grass and strawberry clover. Improving pastures by establishing rye grass and *Phalaris tuberosa* (*bulbosa*) also holds out great possibilities.

In the lower rainfall areas we must, to a much greater extent, depend upon cereal crops (wheat, oats, &c.) as our main stays.

Generally speaking, the winter and spring months can be expected to give fairly satisfactory, and in many cases excellent, pasture conditions which can be very often improved by the judicious use of superphosphates as a top dressing; but, generally speaking, the summer feeding becomes a problem.

The establishment of lucerne is of great assistance, and should, I think, be developed as much as possible. If any means of watering is available, so much the better.

Although cereal hay or chaff is not absolutely ideal for dairy cattle, supplemented by green feed when available, crushed grain, and, if possible, a little bran; and in cases, especially during very dry spells, the judicious use of molasses, excellent returns can be obtained.

#### ENSILAGE.

One avenue of storing food has been greatly neglected, and that is ensilage. As a food for dairy cattle during the dry weather, ensilage has few equals and can be made from practically all cereals or natural herbage, &c., either in a tub, pit, or stack.



In dry districts a pit dug in the side of a hill can be expected to give excellent results, and large circular silage stacks will also be quite satisfactory and have a comparatively small percentage of waste. In small stacks the percentage of waste is comparatively high. It is worthy of note that, excepting irrigation areas, most of the highest yielding herds, practically throughout Australia, are fed for the greater part of the year with ensilage as their main bulk ration. A well-filled pit or well-made stack of ensilage will keep in excellent order for years, practically no deterioration taking place.

#### PROBLEMS OF MANUFACTURE.

The greatest problem the dairy farmer in South Australia has to contend with is getting his product—chiefly cream—to the manufacturer in a sound condition.

Our knowledge of butter manufacture has increased greatly during the last few years. The most efficient machinery, churns, pasteurisers, coolers, cream vats, &c., have been developed, but the quality of the original cream is still the controlling factor of butter quality.

Although present-day methods of treatment can be expected—in fact, do, prevent rapid deterioration after treatment—still we are unable to so rejuvenate or alter the quality that a good butter can be manufactured from an inferior cream.

There are many factors which tend to cause cream to depreciate in quality, but depreciation is generally caused by bacterial action and the length of time the cream is held before reaching the manufacturer. Both these factors are accentuated by the climatic conditions.

The average quality of cream, when it reaches the factory in South Australia, is not nearly so good as we would like to see, except possibly for a few weeks in the early part of the season.

#### CLEANLINESS.

The methods to be adopted—to at any rate lessen the depreciation through bacterial action—are well known, and generally quite simple of application and dependent solely on the practice of a sound system of hygiene throughout all processes. Since much the greatest amount of bacterial infection can be traced to contamination from utensils, careful attention to the washing of these will generally have an immediate effect in the direction of improved quality. Too great a stress cannot be placed on the absolute necessity for carefully washing all dairy utensils immediately after use, and having washed them, a liberal use of boiling water for scalding purposes will lay the foundation for a choice article. Provided all dairymen will give this matter the serious consideration it deserves, and carry out the job thoroughly, we will find that a rapid improvement in quality will take place. The obtaining of this very necessary improvement is easy of attainment, with practically no added expense and very little, if any, added labor.

#### HOLDING THE CREAM.

The second main cause of inferior cream, that of age, is not nearly so easy to overcome. Even cream procured under ideal conditions deteriorates rapidly with age, and this deterioration is accentuated or hastened in hot weather. The cream becomes first stale, and then develops a tallowy flavor. Any cream which is more than three days old in summer time can be expected to be falling off in quality, and even during the winter months the chemical changes which take place make four or five days old cream a doubtful proposition.

Notwithstanding our vaunted improvements in methods of manufacture, we are still unable to improve cream once it has developed a stale or tallowy flavor. As a matter of fact, since these flavors are due to chemical changes taking place, pasteurisation, which



has wrongly been quoted as a cure for all evils, has a tendency rather to accentuate than lessen the trouble. This underlying stale flavor is the main trouble with the majority of our inferior butters.

Provided the amount of cream available is sufficient to warrant the cream being forwarded to the factory more often than three or four times a week in summer and at least twice a week in winter, this trouble can be easily rectified.

Unhappily, we have to depend for the great bulk of our cream from people who only keep a small number of cows, and may live long distances away, with the result that the cost of transport very often does not warrant quick and regular deliveries of the cream to the factory. In these cases, the problem is very hard to solve satisfactorily, but by keeping the cream as cool as possible, stirring two or three times each day, mixing the fresh cream as soon as it is cool with the old cream, and keeping it as cool as possible during transport, much can be done.

The manufacturers can be depended on to make the best possible use of the cream, and the larger the amount of comparatively fresh cream which is available, the greater the amount of slightly inferior cream can be used.

Although this suggestion may appear like "robbing Peter to pay Paul," nevertheless the blending of choice and slightly inferior cream must be recognised as an accepted commercial and economic practice, as our object is to obtain the greatest good for the majority, but, at the same time, we must uphold the quality of our finished product and give the consumer a sound article.

So serious has this matter become that it will be absolutely essential for us to enforce the efficient grading of all cream by the factory representatives, and although the fact of the cream being classified as second grade will no doubt come as a shock, and possibly cause a considerable amount of heartburn amongst producers, nevertheless, it is the only way to bring about a definite improvement in cream and butter quality.

Admittedly strict grading of cream might seem to adversely affect those persons who have to send their cream long distances, yet it is doubtful whether, in the long run, it will materially affect their net returns, and extra attention given to the details of handling, &c., can confidently be expected to show a marked improvement, and may even considerably lengthen the accepted time during which the cream will remain sound.

I do not profess to have touched on all our problems, but I have picked out those which appear to me to be of paramount importance at the present moment, with a hope that some discussion might accrue, and thus help to solve—if only in part—some of the problems with which we are confronted.

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## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

## FORTY-FIRST ANNUAL CONGRESS.

*[Continued from page 368, Journal of Agriculture, November, 1930.]*

## TUESDAY, SEPTEMBER 16TH.

Portion of the papers read at the Men's Congress on Tuesday, September 16th, appear elsewhere in this issue.

At the Horticultural session held in the afternoon, the following resolution was carried:—"That results of investigations into the cause of and remedy for gumosis in apricots be made available at the Conference of Non-Irrigated Fruit Areas, at Angaston, in November."

## WOMEN'S BRANCHES.

Delegates from Women's Branches met in the committee room of the Way Hall on Tuesday morning, September 16th. Mrs. J. Hammatt (Williamstown) presided and Mrs. E. L. Orchard acted as Secretary.

## THE COMMON-SENSE KITCHEN.

Mrs. H. BILLING (Wilkawatt) read the following paper:—

In an article entitled "How Can I Make My Kitchen Better?" the opening paragraph read something like this: "If yours is like 99 out of 100 kitchens it is in bad need of bettering. This, the most important room in the house, especially to the woman who does her own work, is usually the worst contrived. It generally lacks proper light and ventilation, and being at the back of the house, rarely has a pleasant outlook. The best room is probably towards the view and too often closed and unused, while the farmer's wife spends most of her waking hours in a kitchen backed towards the barns, or washing dishes against a dead wall. She is apt, too, to keep her cooking utensils, from heavy iron pots inherited from her grandmother down to the eggbeater and nutmeg-grater, in one cupboard and her dishes in another—maybe the length of the long kitchen apart. Does this description fit you?"

Another writer puts it this way: "There are kitchens *and* kitchens. Some of them are a blot on the escutcheon of the housewife and shriek aloud the reason for her weariness."

We do not often realise that the little unnoticed strains are a greater wear and tear on one's vitality than are the big ones.

The kitchen is the central point of the housewife's energies, and if forethought is used in the kitchen outfit there will be a direct return in health and comfort to all those who dwell under the roof.

"Conservation of energy, effort, and of time are essential to the modern woman who has no desire to spend half her life cooking and washing up and grubbing round generally. She wants a few hours to herself and enough vitality left over from housework for recreation and the refreshment of her mind which is not necessarily like a vegetable because she deals with vegetables for part of each day of her life."

There are just two rules for constructing an ideal kitchen—

*First*—Make sure that everything you need is ready to hand; that is, make it convenient; eliminate all unnecessary fetching and carrying.



*Second*—Make it pretty: in other words, make it good to look upon and therefore restful to work in. Make it productive of good and healthful cookery by means of right tools and utensils adapted to their work.

*Good Service Tests*—

1. Each tool or utensil must do some one thing so efficiently that its presence is warranted.
2. Or: it must be adaptable to many purposes.
3. Must require only a fair amount of time and care to keep it in order.
4. Must be sufficiently durable to return a reasonable service for the purchase price, weight and durability must be considered.

*Types of Kitchen*—

1. Kitchen: living room of family as well as the workshop of the home.
  2. Maid's sitting room when day's work is done.
  3. Solely the workshop of the woman who runs her house without any domestic help.
- A southern aspect is best in this country; the kitchen must be bright, airy, and roomy.

*Flooring*—

Flags, tiles, bricks, concrete or wooden boards (boards covered with inlaid linoleum are best).

*Walls*—

1. Glazed tiles or painted walls are ideal.
2. High-tiled dado with distemper or other suitable finish, above.
3. Whole wall washed with simple distemper.
4. Varnished paper also appropriate.
5. White-washed walls.

Avoid shadows at table and stove; use wall lights rather than lights suspended from ceiling; have a window in the chimney.

A small kitchen saves much walking about, but it is more difficult to work in, as constant tidying up is necessary. The smaller the kitchen the more thought is needed in its equipment.

Plan for the kitchen to be within easy reach of the dining-room. Compactness is a great advantage in any kitchen, and the disposition of cupboards, sink, stove, and table should be thought out with a view to minimise the number of steps that will have to be taken in the various duties to be performed. Try this: place the sink or washing-up table under the window, with stove on the right and kitchen cabinet on left. The sink should be at such a height that the arms of the worker can be stretched out in a normal working position without bending the back at the waist or shoulders. The working surface for the table could be a slab of glass, or marble or linoleum covered. Use newspapers to save work. It is a great save to have an extra table covered with heavy tin or zinc; if without one, keep a few pieces of wood 4 to 5 inches square, 1 inch thick, with a

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screws in the end of each one, hang on a nail or hook, over the worktable; these are useful to stand saucepans on, convenient to cut meat on, to slice bread, roll lemons, and for many other purposes. The sink must have a syphon trap to prevent return of foul gas into the house, with a gully trap outside the wall.

Have nothing on the floor—the bare floor is more easy to sweep and mop. Use shelves—not too wide, as wide shelves are conducive to waste, muddle, and dirt. Paint, enamel or lacquer surface, or cover with linoleum or oilcloth. Imagine a background of blue, green, cream, or pale grey.

If cooking utensils and saucepans are hung or neatly ranged on shelves there is no losing a saucepan lid, no grovelling on the floor groping for a dish that has slipped right to the back of the wide shelf.

Cover cookery books with greaseproof paper.

Divide a cutlery drawer into compartments; have it near at hand for washing up. Place platerack above sink. Keep groceries in glass jars—wide-mouthed, as in sweet shops.

Have a towelrack or line and a roller towel, a good clock, a traymobile, a kitchen slate or book with pencil attached, a scrapbook for hints and recipes, and a small armless rocker and a stool.

After breakfast each day take a 10 to 15 minutes rest and read, with everyone started off to school or the day's activities; the rest will give you a chance to collect your thoughts, and the few minutes spent in reading will refresh your mind and give your spirit a lift through the dish-washing.

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#### FLOOR POLISHING.

Mrs. McCall (Kalangadoo) contributed the following paper:—

Floor polishing, as we all know, is rather a long and tiresome task, but in the following way I think I have cut it down to a minimum of labor and expense with a home-made varnish.

Not only is this varnish suitable for stained boards and linoleums, which it preserves and lengthens their life, but is equally successful when used for varnishing skirting boards, doors, all paintwork, will double the life of fly-wire, will renovate and make travelling bags and suitcases like new, will make waterproof school attache cases—in fact its uses are too numerous to mention. For general use, dissolve 4ozs. brown shellac in 1 pint methylated spirits. For kitchen floors and stained boards that require a hard surface:—4ozs. brown shellac, 2ozs. resin in 1 pint methylated spirits.

As the varnish has a slight tendency to darken, I have found it advisable to add 2ozs. white shellac to the general-use recipe for very light-colored linoleums. By shaking the mixture daily it will take about four days to dissolve, and will keep perfectly if airtight, otherwise the spirit will evaporate. Have surface of floors clean and dry, and working away from the light apply with a light, even stroke of the brush till the whole floor has been done. I find it advisable to give the floors three coats three times during the first year; afterwards once every six to nine months will be ample. On a bright, sunny day I am able to scrub and give three coats of polish to a room 18ft. x 14ft., linoleum and boards, and the cost did not far exceed 2s. 6d.

The greatest advantage of this varnish, which gives a brilliant, mirror-like surface, is that it is *not* slippery—not even to a child. To clean, mop briskly every other day with an oiled mop, and should a mud stain prove obstinate remove with a damp cloth. Kitchen floors—wash in lukewarm water.

Miss Lois Allen, B.A. (Education Department) addressed delegates on the subject, "Differences in Temperament and Ability in Children."

(To be continued.)



## TOMATO DISEASES IN SOUTH AUSTRALIA AND HOW TO CONTROL THEM

with special reference to Glasshouse Tomato Culture.

[By GEOFFREY SAMUEL, M.Sc., Plant Pathologist, Waite Agricultural  
Research Institute, University of Adelaide.]

[Continued from page 377, *Journal of Agriculture*, November, 1930.]

### OTHER ROOT-ROT DISEASES—continued.

*Fusarium Wilt* (caused by the fungus *Fusarium lycopersici*).—In some countries *Fusarium* wilt is one of the worst and most troublesome root-rot diseases of the tomato. Although many plants from glasshouses round Adelaide have been examined, no definite case of *Fusarium* wilt has yet been found. *Fusariums* fairly closely related to *Fusarium lycopersici* have frequently been obtained from rotting roots, but in no case have they exactly resembled this fungus, either themselves or in their effects on the plant. It is rather difficult to understand why this fungus is not known near Adelaide, for it is stated to be of considerable importance in Queensland and New South Wales, and to a less extent in Victoria. It may be that in South Australia by the time the soil conditions become warm enough for the disease to be bad, the plants are fully grown, or it is possible that the South Australian Early Dwarf Red, which is the variety almost exclusively grown in glasshouses, here possesses some resistance to the disease. (The best method of control in areas where the disease is present is the growing of resistant varieties, e.g., Norton, Marvel, Columbia).

The symptoms of *Fusarium Wilt* are rotting of the roots, browning of the wood inside the roots and stem, and sickness and yellowishness of the top of the plant with or without wilting. This disease is one which is severe under high temperature conditions, in contrast to *Verticillium Wilt*, which is a low temperature disease.

*Pythium Root-rots*.—On a number of occasions isolations from diseased tomato roots have yielded several species of *Pythium* fungus. Further research work will be needed before the importance of these can be properly judged. Under certain soil conditions, especially where the subsoil is too close to the surface for the best growth of tomatoes, they appear to play an important part in root-rotting. Roots die back from the tips, the tops of the plants wilt in the warm part of the day, and growth cannot proceed vigorously.

*Control of Root-rot Fungi*.—As explained in the discussion on *Verticillium Wilt*, steam sterilisation would be the best way of ridding soils from these root-rot diseases. Since heat is not necessary in the growing of the tomatoes here, however, no growers have any apparatus for steam sterilisation. As land gets more expensive it is probable that co-operative steaming plants may be established, but for the present growers find it cheaper simply to move their houses to a fresh piece of ground which has had a spell for several years. The glasshouses are usually spaced at equal glasshouse widths, so that all that is necessary is to move the roofs across. It is possible, however, that larger glasshouses and taller varieties may later come into favor, and these would not be so easily shifted.

Apart from this, the best advice that can be given is to see that the growing conditions for the plants are as good as possible. The old roots of the previous crop should, of course, be carefully pulled out and burnt.



The suggestion given before to allow the soil to dry out thoroughly once or twice in the greatest heat of midsummer, when the plants are out of the houses, might also be tried here. If these methods, coupled with the best conditions of growth and manurial treatment, do not overcome the trouble, the only solutions left under our present conditions are either the moving of the glasshouses or trying dwarf beans to give the soil a spell from tomatoes for a year. This was not recommended for *Verticillium* Wilt, because beans have been found to be affected by the latter disease.

#### LEAF-SPOT.

*Description.*—Leaf-spot is easily recognised as small circular or irregular-shaped dead spots on the leaflets (Fig. 21). The spots are usually brown, paling to light brown or ashy color in the centre, and frequently the green tissue round the spots becomes yellowish; a careful examination will reveal minute black specks present at the centre of the spots.



FIG. 21.—Tomato leaflets showing the dead spots with light brown to ashy-colored centres—due to the Leaf Spot fungus.

In glasshouses leaf-spot is usually only bad where there is some drip on to the plants. It is frequently worse on tomatoes in suburban gardens, especially when they are watered overhead every day or so and are not pruned and straggle over the ground. Under these conditions, where the lower leaves especially are under constantly moist conditions, leaf-spot can sometimes become very bad and the leaves be riddled with spots. Badly diseased leaves turn yellow and die, and the disease gradually spreads upwards, seriously defoliating and injuring the plant.

*Cause.*—Leaf-spot is caused by a fungus (*Septoria lycopersici*). The small black specks in the centre of the leaf spots are the spore-sacs of the fungus, and each one can contain some hundreds of the fungus spores (Fig. 22.). The spores of this particular fungus are thin, elongated, and colorless,



but so small as to be invisible to the naked eye. They are extruded through the mouths of the spore-sacs under moist conditions and lie in heaps of some hundreds in the centres of the leaf-spots. A drip of water or the splashing of overhead watering may then splash them on to other leaves, where they germinate under the moist conditions and fungus threads penetrate inside the leaf. The growth of the fungus inside the leaf causes the leaf tissue to die in the characteristic spot, and the fungus then forms its spore cases again in the dead tissue at the centre.

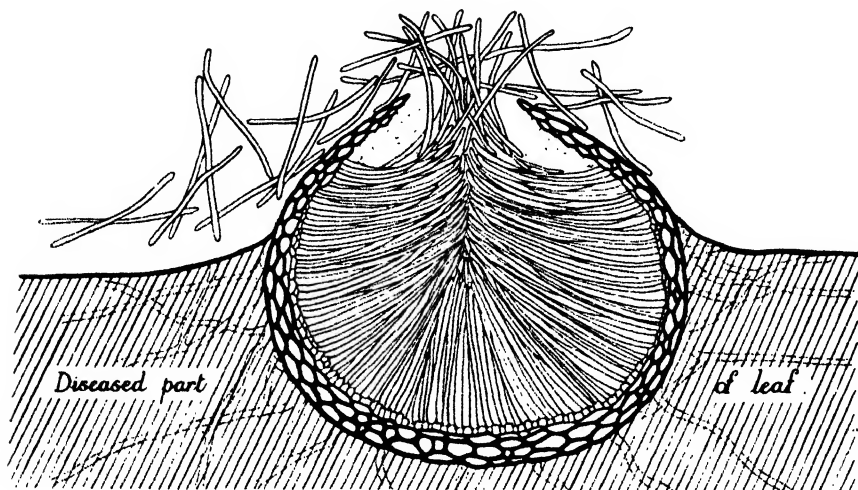


FIG. 22.—One of the small black specks, visible in the ashy-colored centre of a Leaf Spot, when magnified 250 times is seen to be a spore-case of the fungus producing some hundreds of long, thin, spores, which are pushed out through the neck, and can be splashed or washed about by overhead drip or watering.

*Control.*—In glasshouses the checking of drip or other conditions which keep the leaves moist should be sufficient to stop the disease. If difficulty is found in curing it this way the use of a copper-lime dust should prevent the trouble spreading.

In the open several precautions can be taken. If plants are pruned and staked they are rarely troubled with the disease under the dry climatic conditions here. Unpruned plants should be watered by trenches instead of overhead watering if the disease is seen on them. Straw placed under the branches so that they do not lie directly on the moist soil will aid somewhat. If the disease is actually spreading and causing trouble in spite of these precautions a Bordeaux Mixture spray will have to be applied. In countries with climatic conditions more favorable to the disease regular sprayings with Bordeaux Mixture are carried out. A copper-lime dust should be satisfactory if used thoroughly. Finally, the proper destruction of diseased leaves at the end of the season and growing the following year's crop on some other piece of ground will also aid in minimising trouble from this disease.



## EARLY BLIGHT LEAF DISEASE.

*Description.*—This disease is recognisable by the dark-colored, often concentrically-zoned, spreading spots on the leaves (Fig. 23). Very frequently the spots start from the margins of the leaves, which become curled round or twisted over somewhat. Affected leaflets finally dry and shrivel to a brown color. If not checked early the disease can cause considerable dying of the leaves and seriously reduce the vigor of the plants.

In America the stems and the fruit may also be spotted and the name nailhead-spot is often given to this form of injury. So far, however, it is only the leaves of the South Australian Early Dwarf Red tomato which have been found affected.



FIG. 23.—Tomato leaflets showing the dark-colored "zoned" spots of Early Blight. (See also Fig. 2.)

*Cause.*—Early blight is caused by a fungus (*Macrosporium solani*) which has been described on pages 256-7 (October issue).

*Control.*—This is a much more serious fungus in glasshouses than the leaf-spot fungus, for it seems to be able to attack the plant when much less moisture is present. No actual drip is necessary to enable it to spread, and the small amount of moisture which condenses on the leaves in the very early morning, provided it lasts long enough, is quite sufficient to enable the fungus to infect. In the cases which have come under notice it has been glasshouses some distance from the sea which have been most affected, and it seems probable that the greater fall of temperature at night, with deposition of a film of moisture on the leaves, has been responsible.

Any practices which tend to reduce the humidity should, therefore, be of some aid in controlling Early Blight. So far the disease has not been found in the large type of glasshouse, possibly because of the lower



humidity. Better control of ventilation in the smaller houses should be of assistance in keeping down the humidity at critical times, but it is unlikely that sufficient control could be obtained in this way alone to check the disease.

The picking off of infected leaflets during "inspections" of the glass-houses can do quite an appreciable amount of good in the early stages, before there are too many to deal with. It should really be done in the earliest stages of the spots, before the crops of spores have ripened, however, and a practised eye is therefore needed to detect the spots quickly.



FIG. 24.—Tomato leaflets shrivelling to a light-brown color due to the attack of *Pleospora* fungus. Usually numerous tufts of a blackish mould fungus appear on the dead leaves, but this mould is not the cause of the disease, and only establishes itself on the dead tissue under the humid conditions in the glasshouse. The affected leaflets finally die back to the leaf-stalk.

As soon as Early Blight spots are noticed a dusting with copper-lime dust should be given. Dusting with a sulphur dust should be of benefit if a copper dust is not available, but American experiments have shown that copper dusts are more effective against Early Blight than are sulphur dusts. Keep new growth covered with a film of dust by dusting every ten days or a fortnight.

Once again particular attention should be paid to the destruction of diseased material in the clean-up at the end of the season. It would also be advisable to give a good lime-sulphur spray inside the houses which were infected, directing the spray into all cracks of the woodwork.

Finally, potatoes should not be grown near the houses, for they are subject to the same disease.

#### PLEOSPORA LEAF BLIGHT AND FRUIT SPOT.

*Description.*—This is a disease which requires further scientific examination before much can be said about it. A case occurred in which a great deal of damage was being done to the leaves of tomato plants in one house,



and the trouble subsequently spread to four other houses. The leaflets got dead patches on them, of a pale chamois-leather color, which quickly spread until the whole leaflet was killed (Fig. 24). Tufts of greenish-black mould soon appeared on the affected leaflets, but these were only secondary, establishing themselves as saprophytes on the dead tissue in the humid conditions. Affected leaflets quickly died back to the stalk, and it was usually not long before all leaflets on a leaf were affected. The disease gradually worked up the plant, so that in bad cases the whole of the leaves, except those near the top of the plant were dead. Occasionally small spots appeared on the fruit (Fig. 25), but these were not very frequent.

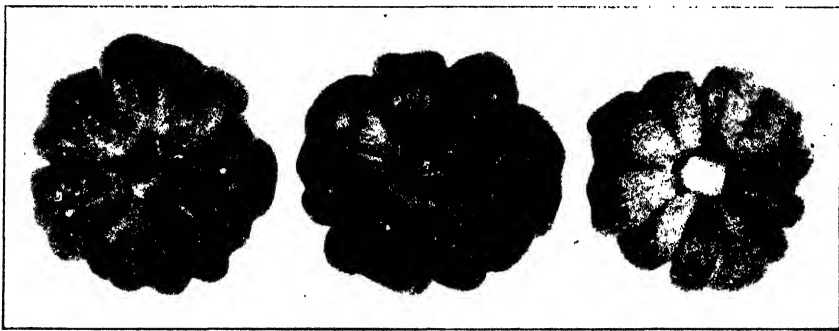


FIG. 25.—Fruit-spots caused by the *Pleospora* fungus.

*Cause.*—An examination showed that there was a certain amount of Early Blight present in the houses, but on most of the dying leaflets no trace of Early Blight could be found. Early Blight spot is dark at the centre, and can scarcely be mistaken when known. Further examination was made by making isolations from the diseased spots in culture dishes. In by far the largest number of cases a fungus was obtained which first formed *Stemphylium* spores and later *Pleospora*.

*Stemphylium* spores were also noted on the affected leaflets in the glass-houses, and were at first thought to be the spores of a saprophytic fungus in the same class as the *Cladosporium*, which was the most abundant saprophyte.

The results were similar in isolations from the fruit spots. When the fruit was gathered, the spots were thought to be probably the "nailhead-spot" stage of Early Blight. In no case, however, was the Early Blight fungus isolated from these spots, but in every case the *Stemphylium-Pleospora* fungus. The Early Blight fungus was only obtained in culture from leaflets which showed one of the characteristic dark spots.

All the evidence from microscope and culture work, therefore, points to the *Stemphylium-Pleospora* fungus as being the one responsible for this definite type of leaflet death. Unfortunately the matter could not be followed up at the time as far as the final proof of parasitism of the fungus by inoculation experiments.



**Control.**—The fungus forms numerous spores on the surface of the dead leaflets, and these are readily blown about in currents of air and can evidently germinate with very little moisture present. Since the fungus is similar in its action to Early Blight, similar recommendations for control are all that can be given until we know more about the disease. The recommendations include early action with copper-lime dust if the fungus is seen, reduction of humidity as far as possible, and destruction of refuse and treatment of houses at the end of the season.

#### PHOMA FRUIT ROT.

**Description.**—This is typically a stem-end rot. A black, rotten patch is seen to start, usually at a crack in the fruit at the stalk end, and gradually spreads until half the fruit or more is rotten, with a charcoal black, crinkled skin.

**Cause.**—The disease is caused by a fungus (*Phoma destructiva*) which can only infect the fruit through cracks in the skin. Once it has gained entrance through a crack the fungus grows into the flesh of the fruit, causing the typical collapse and rotten patch. When it has grown for a certain time

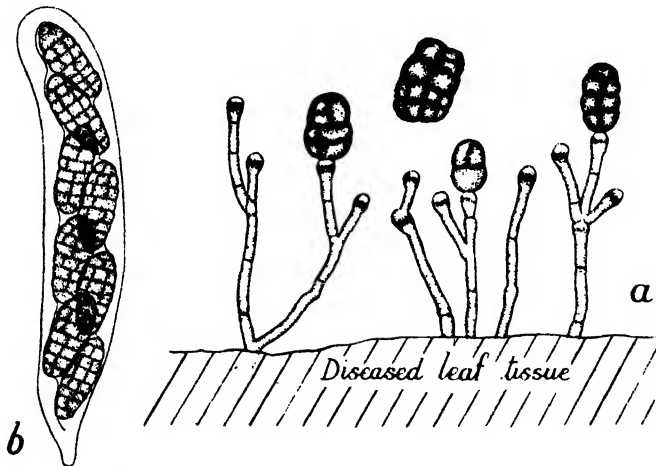


FIG. 26.—(a) *Stemphylium* stage of *Pleospora* leaf blight fungus. Spore-bearing branches projecting from diseased leaf tissue and bearing spores. Magnified 250 times.

(b) A later stage of the same fungus, showing eight spores borne in an ascus sac.

it forms numerous black spore cases just under the skin of the fruit, so that the centre of the patch appears as if studded with very minute black pimples. Under moist conditions these exude small pinkish droplets, which are really little heaps of thousands of spores of the fungus.

**Control.**—The only case in which this fungus was found causing damage in South Australia was one in which another variety of tomato was being grown than the usual Early Dwarf Red. The fruit of this variety cracked at the stem end, whereas the Early Dwarf Red rarely cracks. The most important point in control would therefore appear to be to grow a variety in which the fruit does not crack.



As control measures to apply when the disease has appeared, the most important are:—(1) Pick affected fruit as soon as the patches are seen so as to prevent the production of large numbers of spores, and (2) spray the stem ends of the fruit with Bordeaux Mixture or dust with copperlime dust. This is not a certain preventive, however, since cracking of the fruit can lay open fresh unprotected tissues.



FIG. 27.—Black rotten patches starting from cracks at the stem end of tomato fruits, caused by the *Phoma* fruit rot fungus. Eventually half the fruit can become a coal-black rotten mass.

#### BLOSSOM END ROT.

*Description.*—Blossom end rot is very easily recognised from the large rotten patch which appears at the blossom end of the fruit (Fig. 28). It is usually roughly circular, but may at times be more irregular, or only on one side of the central point. The spot is usually rather soft in the early stages, becoming somewhat firm and shrunken when older, and



FIG. 28.—Tomato fruits showing the big rotten patch at the blossom end characteristic of Blossom End Rot.

changing from a putty color to a dark brown. In moist climates moulds often gain a footing on the dead tissue and complicate matters by starting a secondary rotting. This does not usually happen in the dry summer climate of South Australia, however, and the most familiar form of the trouble here is the round, firm, sunken, brown patch.



*Cause.*—The cause of blossom end rot is a period of drought for the plant just as the fruit is ripening. The plant need not actually droop from want of water, but the water-loss from the leaves may be more than the roots can supply and water be withdrawn from the fruits. At a critical period in the growth of the fruit, such loss of water results in the dead patch at the end of the fruit known as Blossom End Rot. The real cause is probably that as water is withdrawn from the fruit the acids present in the cell-sap become concentrated sufficiently to kill the cells. The exact mechanism of the process is not yet known, however, but it has been well established that no parasitic fungus is responsible for the condition, and that it is due merely to fluctuations in the water supply.

*Control.*—The obvious control measure, therefore, is to be sure that the plants do not suffer from lack of water at any stage. Tomatoes like a well-drained soil with plenty of water available. Something can be done to

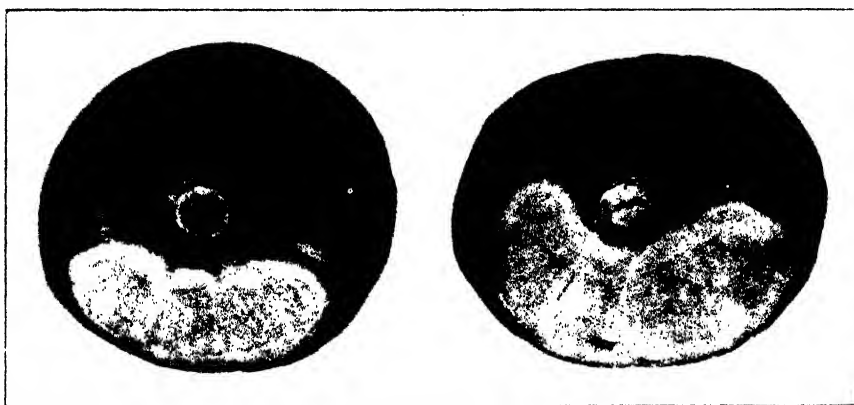


FIG. 29. --Tomato fruits showing the tough white patch due to sunburn.

minimise the frequency of watering by hoeing and mulching (especially for the outdoor crop), but neither of these can relieve the tomato grower from the necessity for constant attention to watering.

#### WATERY FRUIT.

*Description.*—There is a condition of the fruit in which the flesh is not as firm as it should be, and does not ripen to an even opaque red color. The fruit has a slight watery appearance, so that parts of the network of veins become visible with semi-transparent areas in between. The “feel” of the fruit is slightly “bladdery,” and not firm as it should be.

*Cause.*—The cause of this watery condition of the fruit has not yet been specially investigated, but it appears to result from the use of too much nitrogenous manure.

*Control.*—It must be remembered that stable manure, blood manure (or manure containing blood), sulphate of ammonia, and nitrate of soda all contain nitrogen. If more than one or two of these manures are being used the plant may be getting more nitrogen than it requires, unless phosphate and potash are liberally supplied also. If watery fruit is being



harvested, therefore, a dressing of one part of superphosphate and three part of sulphate of potash should be applied at the rate of about 50lbs. per 100ft. of house. Potash has an excellent effect in firming up soft fruit, and is needed by tomatoes in greater quantity than by most other plants.



FIG. 30. - A pallid leaf. The cause of this condition is not known, but increased manuring seems to benefit the plants.

#### PALLID LEAVES.

*Description.*—This is another trouble about which little is known yet. The leaves become “pallid” or whitish, especially in the central part of the leaflets, except that the normal green color often runs along the veins in parts (Fig. 30). It is quite distinct from mosaic in that there is no blistering or rolling of the leaves, and the mottling is not one of dark-green and lighter-green areas as in mosaic, but a general pallidity with veins of green going through it.



*Cause.*—The cause of this condition of the leaves is not known. In an experiment in which the sap from affected leaves was inoculated into healthy plants, no disease was produced in these plants. It is probable that the trouble is nutritional.

*Control.*—In one case where the trouble became particularly marked it was largely cured by the application of a dressing of manure containing a little extra sulphate of ammonia. Although nitrogen was possibly not the particular element which was lacking, the application of a dressing of manure may have effects in making other elements more available from the soil. The possibility of lack of iron or manganese being connected with the trouble should be investigated.



FIGS. 31 and 32. —Two forms of Rosette disease, the cause of which is not yet known.

#### BUCK PLANTS.

*Description.*—Occasionally big, rank plants with large stems and over-developed leaves, and without flowers or fruit, are found in glasshouses. They are usually called “buck” plants here, and are known as “bull plants” in America.

*Cause.*—The cause of this condition (gigantism) is probably some genetic abnormality, which is best expressed popularly by the word “freak.” Since the plants are of no use they are best removed as soon as they are noticed, for they are only using water and plant food which would be more profitably made use of by the normal plants alongside.

#### ROSETTE.

*Description.*—Rosette (often called “blue-top” in Victoria) is very easily recognised from the way in which the shoots “go blind” instead of developing normally. An excessive number of sideshoots are produced at the tips of the branches, but with small, undeveloped leaves so that the shoot is tufty in appearance (Fig. 32). The fruit bunches are stiff, with swollen and abnormal flowers which do not develop, or which develop only to small, tough, woody fruit. Sometimes the affected branches become very thick and swollen below the aborted flowers (Fig. 31).



Usually it is only odd scattered plants which become affected, but there have been occasional records of a single grower having some hundreds affected at the same time. The plants always start off normally, and do not develop the rosette habit until they are about a foot high.

*Cause.*—The cause of this disease is at present unknown. No parasitic organism has been found associated with it, and in two preliminary tests at the Waite Institute the sap of diseased plants failed to reproduce the disease when inoculated into healthy plants. Further research work will be necessary to determine the nature of the disease.

*Control.*—Since the cause is not known, little can be said about control. Fortunately the trouble is rarely sufficient in amount to call for definite control measures. A correspondent of the *New South Wales Agricultural Gazette* in 1904 stated that about half a patch of thirty plants growing under very dry conditions became infected, but that a few plants which obtained plenty of water developed normally. At all events, since affected plants are useless for further fruit-bearing, they are better pulled out.

(*To be continued.* The next article will deal with Insect Pests.)

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## ORCHARD NOTES FOR SOUTHERN DISTRICTS, DECEMBER, 1930.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

Picking and marketing of soft fruits will be the principal work for the month. It is not an easy proposition to carry this out satisfactorily, because the fruit ripens unequally, and to make a good pack, firm and ripe fruit should not be put together, but into separate containers. In any case the fruit must have started to ripen before it is picked, or it will not ripen at all, and the nearer the fruit is to fully ripe on the tree the better will be the flavor. Trays should be used for the best of soft fruits. Do not waste fruit which is too soft to pack, dry it. A pamphlet giving directions about treatment of fruit for drying may be obtained from the Department of Agriculture by sending a twopenny stamp for postage.

The comparative scarcity of apples will make the attack of codlin moth more noticeable this season, and every effort must be made to prevent too great a percentage of fruit from damage. Arsenate of Lead is the remedy, and a covering of this should be kept on the fruit always, unless it is intended to try the white oils later on.

Root borers will be found in pairs on the foliage now and may be picked off, or if a strong mixture of Arsenate of Lead is being used for curculio beetle it will also kill the borers. Borers in apricot, peach, and almond may be stopped by soaking a small bit of cotton wool in petrol and inserting in the hole; stop the hole with soil rubbed in. Aphides will need to be sprayed with Black Leaf 40 and soap, or parasites may be obtained by sending sixpence to the Blackwood Orchard to pay postage. Cutworms must be stopped with Arsenate of Lead. Use sulphur dusts for Oidium of the vine, and Bordeaux for downy mildew if it should start. Use Lime Sulphur or Sulphur Dust for red spider if it is observed. Cherry or pear slug can be stopped by the use of Arsenate of Lead, either wet or dry; many shrubs are attacked by this pest. Do not use sprays on ripening cherries.

Strawberries need water to grow to their best size, and mulching is helpful.

Almonds should be sized, and varieties kept separate if the best prices are expected.

Open up tomato houses for ventilation on hot days, and use only enough water to keep the soil moist—not wet; keep free from weeds outside as well as inside the house.

Bud off all unnecessary shoots from vines and trees.

Budding may be commenced; use only buds from proved trees.



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.  
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending November 30th, 1930. |                         |                         |         |
|--------------------------|---------------------|---------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                       | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 90                                      | (5) 113                 | (6) *                   | 203     |
| Williams, W. R. ....     | Frewville .....     | (7) 130                                     | (8) 155                 | (9) 195                 | 480     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 161                                    | (11) 140                | (12) *                  | 301     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 155                                    | (14) 175                | (15) *                  | 330     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 109                                    | (17) *                  | (18) *                  | 109     |
| Pearman, E. D. ....      | Rosewater .....     | (19) 146                                    | (20) 143                | (21) 134                | 423     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                      | (23) *                  | (24) 141                | 141     |
| Burton, C. J. C. ....    | Mallala .....       | (25) 164                                    | (26) 148                | (27) 160                | 472     |
| Heath, H. E. ....        | Mile End .....      | (28) 163                                    | (29) *                  | (30) 139                | 302     |
| Heath, H. E. ....        | Mile End .....      | (31) 135                                    | (32) 114                | (33) 110                | 359     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 120                                    | (35) 143                | (36) 156                | 419     |
| Howard, T. W. ....       | Woodville .....     | (37) 143                                    | (38) 114                | (39) 146                | 403     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                      | (41) 156                | (42) 142                | 298     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 107                                    | (44) 167                | (45) 148                | 422     |
| Gameau, V. F. ....       | Woodville .....     | (46) 149                                    | (47) 146                | (48) 110                | 405     |
| Gameau, V. F. ....       | Woodville .....     | (49) 148                                    | (50) 103                | (51) 140                | 391     |
| Aird, J. R. & Son .....  | Kilkenny .....      | (52) 120                                    | (53) 149                | (54) 157                | 426     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                      | (56) 118                | (57) *                  | 118     |
| Barrett, L. ....         | Angaston .....      | (58) 118                                    | (59) 129                | (60) 145                | 392     |
| Barrett, L. ....         | Angaston .....      | (61) *                                      | (62) 91                 | (63) 158                | 249     |
| Barrett, L. ....         | Angaston .....      | (64) 130                                    | (65) 104                | (66) 115                | 349     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 110                                    | (68) 77                 | (69) 160                | 347     |
| Wiese, W. ....           | Cabra .....         | (70) 178                                    | (71) 158                | (72) 147                | 483     |
| Wiese, W. ....           | Cabra .....         | (73) 159                                    | (74) 154                | (75) 139                | 452     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 148                                    | (77) 136                | (78) 144                | 428     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                      | (80) †                  | (81) 141                | 141     |
| Riggs, N. ....           | Camden Park .....   | (82) 176                                    | (83) 143                | (84) *                  | 319     |
| Riggs, N. ....           | Camden Park .....   | (85) 162                                    | (86) 112                | (87) 142                | 416     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 145                                    | (89) 163                | (90) 168                | 476     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 118                                    | (92) 153                | (93) 168                | 439     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                      | (95) 132                | (96) *                  | 132     |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 171                                    | (98) 145                | (99) †                  | 316     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 166                                   | (101) 62                | (102) *                 | 228     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 131                                   | (104) *                 | (105) *                 | 131     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 112                                   | (107) 129               | (108) 153               | 394     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 144                                   | (110) 181               | (111) *                 | 325     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 166                                   | (113) 139               | (114) *                 | 305     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 143                                   | (116) 134               | (117) 131               | 408     |
| Hill, W. ....            | Knoxville .....     | (118) 145                                   | (119) 152               | (120) 145               | 442     |
| Hill, W. ....            | Knoxville .....     | (121) 153                                   | (122) 150               | (123) 144               | 447     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 130                                   | (125) *                 | (126) 106               | 236     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                     | (128) 152               | (129) 146               | 298     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 43                                    | (131) 143               | (132) 145               | 330     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 140                                   | (134) 152               | (135) 173               | 465     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 166                                   | (137) 154               | (138) 146               | 466     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 162                                   | (140) 136               | (141) 101               | 399     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.             | Address.            | Score for Month ended November<br>30th, 1930. |                               |                               |         |
|--------------------------|---------------------|-----------------------------------------------|-------------------------------|-------------------------------|---------|
|                          |                     | Bird No.<br>and Eggs<br>Laid.                 | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Compton, R. C. ....      | Woodeforde .....    | (142) 108                                     | (143) 153                     | (144) 144                     | 405     |
| Connor, D. C. ....       | Gawler .....        | (145) 98                                      | (146) 125                     | (147) 111                     | 334     |
| Robinson, A. E. ....     | Hectorville .....   | (148) 181                                     | (149) 156                     | (150) 159                     | 496     |
| Vann, R. S. ....         | New Hindmarsh ...   | (151) 131                                     | (152) 114                     | (153) 96                      | 341     |
| McLean, J. G. ....       | Black Forest .....  | (154) 99                                      | (155) 93                      | (156) 123                     | 315     |
| Fidge, H. ....           | Clarence Park ..... | (157) 123                                     | (158) 116                     | (159) *                       | 239     |
| Fidge, H. ....           | Clarence Park ..... | (160) 99                                      | (161) 120                     | (162) 159                     | 378     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (163) 155                                     | (164) 97                      | (165) *                       | 252     |
| Tolhurst, A. E. ....     | Torrens Park .....  | (166) 141                                     | (167) 107                     | (168) 135                     | 383     |
| Monkhouse, A. J. ....    | Woodside .....      | (169) 129                                     | (170) 151                     | (171) *                       | 280     |
| Monkhouse, A. J. ....    | Woodside .....      | (172) *                                       | (173) *                       | (174) 139                     | 139     |
| Monkhouse, A. J. ....    | Woodside .....      | (175) 140                                     | (176) *                       | (177) *                       | 140     |
| Monkhouse, A. J. ....    | Woodside .....      | (178) *                                       | (179) *                       | (180) 111                     | 111     |
| Sage, H. R. ....         | Nuriootpa .....     | (181) 109                                     | (182) *                       | (183) 147                     | 256     |
| Mitchell, W. J. ....     | Woodside .....      | (184) 153                                     | (185) *                       | (186) 175                     | 328     |
| George, L. E. ....       | Redfern .....       | (187) 165                                     | (188) 171                     | (189) 131                     | 467     |
| George, L. E. ....       | Redfern .....       | (190) 161                                     | (191) 147                     | (192) *                       | 308     |
| George, L. E. ....       | Redfern .....       | (193) 116                                     | (194) 151                     | (195) 150                     | 417     |
| George, L. E. ....       | Redfern .....       | (196) 135                                     | (197) 159                     | (198) 164                     | 458     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (199) 156                                     | (200) 153                     | (201) *                       | 309     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (202) 128                                     | (203) 118                     | (204) 118                     | 364     |
| Gameau, V. F. ....       | Woodville .....     | (205) 137                                     | (206) 117                     | (207) 126                     | 380     |
| Totals .....             |                     | 8,119                                         | 7,713                         | 7,083                         | 22,915  |

*Section 3.—Black Orpingtons.*

| Competitors.             | Address.            | Score for Month ending November,<br>30th, 1930. |                               |                               |         |
|--------------------------|---------------------|-------------------------------------------------|-------------------------------|-------------------------------|---------|
|                          |                     | Bird No.<br>and Eggs<br>Laid.                   | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Aird, J. R., & Son ..... | Kilkenny .....      | (208) 120                                       | (209) 98                      | (210) 140                     | 358     |
| Aird, J. R., & Son ..... | Kilkenny .....      | (211) 109                                       | (212) 129                     | (213) *                       | 238     |
| Williams, W. R. ....     | Frewville .....     | (214) 132                                       | (215) 154                     | (216) 144                     | 430     |
| Williams, W. R. ....     | Frewville .....     | (217) †                                         | (218) *                       | (219) 120                     | 120     |
| Gurr, A. and H. ....     | Scott's Creek ..... | (220) *                                         | (221) *                       | (222) *                       | —       |
| Andrewartha, A. ....     | Underdale .....     | (223) *                                         | (224) 154                     | (225) 147                     | 301     |
| McFarlane, A. S. ....    | Kilkenny .....      | (226) 156                                       | (227) 131                     | (228) 138                     | 425     |
| Connor, D. C. ....       | Gawler .....        | (229) *                                         | (230) 135                     | (231) *                       | 135     |
| Gillick, W. J. ....      | New Hindmarsh ...   | (232) 88                                        | (233) *                       | (234) *                       | 88      |
| Osborn, E. L. ....       | Camden .....        | (235) 113                                       | (236) 152                     | (237) 143                     | 408     |
| Totals .....             |                     | 718                                             | 953                           | 832                           | 2,503   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.            | Score for Month ending November,<br>30th, 1930. |                               |                               |         |
|--------------------|---------------------|-------------------------------------------------|-------------------------------|-------------------------------|---------|
|                    |                     | Bird No.<br>and Eggs<br>Laid.                   | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Gameau, V. F. .... | Woodville .....     | (238) 117                                       | (239) 132                     | (240) 90                      | 339     |
| Fidge, H. ....     | Clarence Park ..... | (241) 144                                       | (242) 144                     | (243) 82                      | 370     |
| Totals .....       |                     | 261                                             | 276                           | 172                           | 709     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



## SULPHURING APRICOTS.

REVISED PROCEDURE RECOMMENDED BY COMMITTEE CONVENED TO DRAW UP A STANDARD METHOD.

Last year a committee, consisting of Messrs. Geo. Quinn (Chief Horticultural Officer, South Australia), C. G. Savage (Director of Fruit Culture, New South Wales), A. V. Lyon (Officer in Charge, Research Station, Merbein), and W. R. Jewell (Research Chemist, Department of Agriculture, Victoria), was convened by the Council for Scientific and Industrial Research to consider the question of sulphuring dried fruits, and it issued a recommended procedure which, in the case of apricots, might reasonably be expected to give a satisfactory product without an excess of sulphur dioxide. The sulphuring of peaches and pears, in the opinion of the committee, did not offer any serious difficulties.

As a result of experimental work conducted by the members of the committee last season it is now in a position to recommend a somewhat modified procedure which is likely to give more satisfactory results. This procedure is outlined below.

In view of the fact that quantities of apricots were again oversulphured last season, it would appear that some growers have still failed to realise the care that is essential in sulphuring, and it is apparent that growers must take more care if the resultant product is to comply with the regulations in force here and in England regarding the amount of sulphur dioxide permitted in dried fruit. In his own interests, therefore, every grower producing dried apricots is strongly recommended to adopt the procedure outlined below, when he should experience little difficulty in keeping the sulphur dioxide content below 14 grains per lb., and, at the same time, produce a marketable product.

### RECOMMENDED PROCEDURE.

(a) *Maturity*.—It is essential that all fruits be picked "eating ripe," and that, when cutting, all firm or overripe fruit should be put to one side and either discarded or sulphured separately, so that all the fruit in one chamber may be of uniform maturity, and, therefore, yield a uniformly sulphured product. It is recognised that firm fruit absorbs sulphur less readily than ripe, and generally gives an unsatisfactory product.

(b) *Type of Chamber*.—It is recommended that an air-tight chamber be used, the covering of which should be of some light material, *e.g.*, "malthoid." In the case of movable hoods, precautions should be taken to prevent ingress of air at the base of the hood, as, for example, by using compacted, moist earth around the bottom.

A number of small air-tight chambers is recommended in preference to one large one, so that fruit shall not be held for any length of time after cutting and before sulphuring. For example, when using 6ft. x 3ft. trays, the size of the chamber should be sufficient to accommodate a stack of about 15 trays with a clearance of about 6in. between the trays and the sides and top of the chamber. Trays should be staggered 6ins. when stacking.

A vent hole, 1in. in diameter, should be provided in the roof of the chamber close to the wall furthest from the sulphur fire when one fire is used, or in the centre of the roof where a fire is used at both ends of the chamber.

A movable slide, preferably of glass, is a desirable adjunct in order to view the conditions inside the chamber and to test the condition of samples of the fruit.

(c) *Quantity of Sulphur*.—From 6lbs. to 8lbs. of sulphur per ton of fresh-cut fruit should prove ample, and it is essential that the sulphur be dry in order to burn readily. The sulphur pit should preferably be located just outside at one or both ends of the chamber, with a free entrance into the chamber and a small inlet vent to the sulphur pit.



The sulphur should burn steadily during the time the fruit is in the chamber, and slight fumes should be apparent issuing from the vent hole. Should these fumes cease, inspect the sulphur pan. Either relight any unburnt sulphur or add more sulphur if none left. If the sulphur is all burnt before the expiration of the sulphuring period, it is an indication of excessive draught through the hood. In subsequent sulphurings reduce the draught by reducing the size of the inlet and exit vents, and examine the hood for general leakages. It is desirable so to regulate the draught that the requisite quantity of sulphur burn throughout the sulphuring period and be practically burnt out at the expiration of that period.

The weight of fruit in a charge should be ascertained by weighing the quantity of pitted fruit on two or three trays; the average per tray and the total weight per charge can then be obtained. Calculate the amount of sulphur necessary, weigh this and measure the volume in a container. Thereafter it would be sufficiently accurate to measure the same volume of sulphur each time a similar number of trays is sulphured.

(d) *State of Fruit*.—It is desirable to sulphur as quickly as possible after cutting, preferably within two hours. (Hence the desirability, under (b), of a number of small chambers.)

Fruit should be stacked from the bottom upwards in order in which it is cut. Freshly cut fruit absorbs sulphur dioxide more readily than that cut some time prior to sulphuring, and this arrangement of stacking allows the driest fruit to be in contact with the maximum density of warm sulphur fumes, thus tending to uniform sulphuring results.

(e) *Period of Exposure*.—Under average summer day temperatures four to six hours' exposure to the sulphur fumes is considered sufficient to preserve the color without over sulphuring; on very hot days four hours should be sufficient. The practice of leaving the fruit in the sulphur chamber over night is not advocated, as it frequently results in over sulphuring.

(f) *Characteristics of Sulphured Fruit*.—The filling of the cups with juice is not necessarily a reliable indication of satisfactory sulphuring, as fruit in this condition may frequently be over sulphured.

Correctly sulphured fruit is usually characterised by an easily detachable skin with distinct exudation of juice into the cup and a general evenness of color of the cut surface.

(g) *Drying*.—The sulphur dioxide content may be reduced by allowing trays to stand in the shade for one or two days after sulphuring before exposure to the sun, and this procedure is recommended in all cases where there is any suspicion of over sulphuring.

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## FRUIT CROP ESTIMATES IN SOUTH AUSTRALIA, NOVEMBER, 1930.

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[Compiled by GEO. QUINN, Chief Horticultural Instructor, from reports of District Horticultural Instructors.]

North of Adelaide, in the *Barossa, Clare, and Wirrabara areas*, the apple crop is very light, excepting in a few isolated instances, where the yellow varieties—mainly *Cleopatra*—are fair; around Williamstown a few from fair to medium crops of colored sorts are seen. Pears are light in all varieties, including the *William's Bon Christien*.



Quinces and nectarines are light. Peaches are only medium to light, varying with the sorts—very few clingstone sorts are grown. Most sorts of European plums are light, a few Japanese sorts alone showing a fair crop. Prunes are medium, and a few trees here and there heavily cropped being noticeably better than other sorts. Apricots are patchy; some trees good; others practically fruitless. On the whole, they will be well below normal. Almonds are mostly cropping well. Zante currants crop is mostly light; apparently lighter around Clare than in the lower Barossa areas. Wine grapes are showing quite good average crops in some vineyards, in others patchy from the effects of past drought. The general average will probably prove below normal, though prospects have been much improved by good late spring rains. Oranges and lemons are flowering and forming good crops, but many will fall in due course. Expect normal yield.

In the *Mount Lofty Ranges* apples have set a very light crop, though the principal export varieties—Jonathan, Cleopatra, Dunn's, and Rome Beauty blossomed well in most orchards. The yield is estimated in this, our principal apple producing area, at about 20 per cent. of a normal yield. Pears are patchy, the William's Bon Chretien being from light to fair only. The crop is probably 40 to 50 per cent. below normal yield.

Plums of Japanese sorts are very light, and most European varieties patchy. Good crops are showing on trees of Kirk, Greengage, Grand Duke, Giant Prune, D'Agen, Splendor, and old dark French prune varieties. Cherries are mostly light; Early Lyons alone being quite good. The crop generally is estimated at 75 per cent. of normal. Amongst berry fruits gooseberries are good, raspberries and loganberries promise well. Strawberries are promising good yields. These small fruits are only grown in quantities appropriate to local needs.

On the *Adelaide Plains and Southern areas* apples are promising a medium to light yield. Apricots generally are fair to good; nectarines good; peaches fair; and pears fair. Plums of most varieties are promising fair to good yields. Almonds, good average. Tomatoes, good yields generally in glasshouses. Citrus trees have bloomed freely, considering their drought debilitated condition, but the character of the crop of new fruit is problematical at present. Some of the latter sorts, such as Compuda and Late Valencia, have still a fair quantity of marketable oranges hanging. Grape vines of all sorts are looking well, and, judging from the bunches of flowers, there should be a medium crop borne in most vineyards.

In the *South-Eastern districts* apples have blossomed remarkably well, but the setting is distinctly poor, more particularly among the principal export varieties. Apricots (at Coonawarra) promise a good average yield, and the same remark applies to peaches. Pears are patchy, some sorts fair only, but on the whole not above 75 per cent. of a normal crop. Plums and prunes have a normal crop, and almonds are fair.

In the irrigated areas of the *Murray Valley* apricots generally are showing heavy crops, and, owing to spring rains, a fair amount of shothole fungus is noted on the fruits. Nectarines and peaches (Elberta) are mostly well laden. Pears (chiefly William's Bon Chretien) are again promising fair yields; and prunes, though not largely planted, are showing for good yields in some settlements. Almonds are carrying good crops. Orange trees have bloomed profusely, and are looking remarkably well for the coming crop. Generally speaking, a very important awakening in respect to the fertilising of citrus trees has taken place in these areas during the past three or four years, and the trees are now responding in proportion.

Amongst grapes, the Sultana crops are much below average, and look like very little above a 50 per cent. normal yield being gathered. Zante currants are up to average, and Gordos promise to exceed normal quantities. Doradillos are irregular, and mostly only fairly well cropped.



## SEED FROM CROP COMPETITIONS.

The following competitors in Crop Competitions have exhibited crops which, in the opinion of judges, will produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

### RUSSELL AND BUCCLEUCH—

A. J. Walker, Perponda—Felix.  
H. Sanders, Karoonda—Nabawa, Caliph.

### ALFRED—

G. E. Hyde, Paruna—Marriden.  
F. A. Hordow, Paruna—Free Gallipoli.  
A. E. Reichstein, Paruna—Nabawa.  
A. C. Webb, Paruna—Ford.  
A. A. Patterson, Paruna—Sultan.  
C. Wareing, Paruna—Nabawa.  
A. G. Petch, Meribah—Late Gluyas.  
A. A. Marsh, Meribah—Felix.  
A. R. Birch, Nangari—Gluyas, Nabawa.  
J. C. Auricht, Taldra—Gluyas, Late Gluyas, Caliph, South African.  
A. W. Traeger, Loxton—Sultan.

### ALBERT—

W. H. Todd, Caliph—Bald Early.  
T. C. Stott, Mindarie—Bald Early.  
P. J. W. Clonan, Halidon—Free Gallipoli.  
C. H. Russell, Halidon—Ranee.  
G. H. Sutherland, Copeville—Sepoy, Sultan, Free Gallipoli.  
A. E. Carslake, Kumlara—Sultan.

### NORTHERN YORKE PENINSULA—

T. H. Trengove, Bute—Waratah.  
E. W. Clasohm, Artherton—Ford.  
H. E. Aldenhoven, Artherton—Sepoy.  
M. Yelland, Kadina—Waratah.  
H. Rodda, Thrington—Free Gallipoli.  
T. Rodda, Thrington—Nabawa.  
C. Rodda, Thrington—Nabawa.  
E. Yelland, Thrington—Faun.

### JERVOIS—

A. Spriggs, Cleve—Gluyas.  
C. McCallum, Rudall—Gluyas.  
D. McCallum, Rudall—Sultan.  
G. H. Branden, Rudall—Nabawa.  
E. H. Pearce, Rudall—Gluyas.  
W. F. Lake, Rudall—Nabawa.  
F. Hauschild & Sons, Cleve—Bena.

### LE HUNTE—

J. G. Spiers, Wudinna—Caliph.

### CHANDOS—

E. E. Meagher, Murrayville—Free Gallipoli.  
C. and L. Fischer, Pinnaroo—Begum, Free Gallipoli.  
E. Neindorf, Parilla—Caliph.  
C. E. Moyle, Parilla—Sultan.  
J. H. and C. H. Spratt, Lameroo—Sultan, Waratah, Felix.  
C. L. Spratt, Lameroo—Waratah.



Competition. Competitor. Address. Variety.

CHANDOS—*continued.*

A. J. A. Koch, Lameroo—Sultan, Gluyas.  
C. E. Koch, Lameroo—Sultan.  
R. C. Jacob, Geranium—Free Gallipoli.  
Hardy Bros., Jabuk—King's Early.  
W. E. Beelitz, Jabuk—Nabawa, Sultan.

BUXTON—

N. B. Hancock, Kimba—Fauu.

SOUTHERN—

E. W. Woolfit, Strathalbyn—Sultan.  
Thomas Bros., Monarto South—Nabawa.  
C. F. Altmann, Monarto South—Leatherhead.  
C. Brooks, Woodchester—Nugget.  
W. Bermingham, Woodchester—Caliph.  
C. A. Whittlesea, Langhorne's Creek—Nabawa.  
Whittlesea Bros., Langhorne's Creek—Dan.  
Pearson Bros., Brinkley—Dan, Nabawa.  
H. D. and E. G. Humphrey, Brinkley—Nabawa.  
A. B. Jaensch, Bletchley—Currawa.

MIDLANDS—

W. R. Woods & Sons, Mintaro—Bena, Federation.  
A. E. Scarfe, Mintaro—Free Gallipoli.  
J. Ross, Mintaro—Free Gallipoli, Sepoy.  
R. W. Blachford, Mintaro—Free Gallipoli.  
A. L. Sandow, Mintaro—Wannon.  
Keith Shunke, Manoora—Federation and Dan.  
H. Shunke, Manoora—Free Gallipoli.  
L. Thornby, Merilden—Free Gallipoli.  
A. J. Melrose, Mintaro—Free Gallipoli.  
J. S. Miller, Auburn—Federation and Nabawa.  
A. R. Bagshaw, Saddleworth—Dan.  
J. G. Rogers, Saddleworth—Dan and Nabawa.  
Crawford Bros., Saddleworth—Waratah.  
F. Coleman, Saddleworth—Free Gallipoli.  
G. & C. Frost, Manoora—Free Gallipoli.  
J. H. Torr, Farrell's Flat—Bena.  
S. Garrard, Merilden—Free Gallipoli.  
L. A. Martin, Farrell's Flat—Bena and Free Gallipoli.  
R. H. Martin, Farrell's Flat—Bena.  
A. E. Crossing, Farrell's Flat—Free Gallipoli.  
G. Miller, Farrell's Flat—Bena.  
Jas. Brereton, Hanson—Leak's Rust Proof.  
W. J. Woolacott, Hanson—Nabawa, Clarence, and Leak's.  
C. P. Turner, Hanson—Nabawa.  
Jas. Dempsey, Farrell's Flat—Federation.  
H. H. Davis & Sons, Riverton—Waratah.  
A. L. Frost, Riverton—Waratah.  
J. W. Kelly, Riverton—Waratah.  
A. G. Bright, Clare—Free Gallipoli.  
V. M. Lally, Clare—Free Gallipoli.  
W. S. McAuliffe, Buchanan—Nabawa.  
W. Armstrong, Buchanan—Free Gallipoli.  
L. V. Bell, Marrabel—Federation.  
R. & N. Hughes, Kapunda—Onas and Sultan.  
G. Hazel, Kapunda—Wanvan and Nugget.  
W. S. Kelly, Tarlee—Sultan, Currawa, and Sepoy.  
Molineaux Bros., Tarlee—Free Gallipoli.  
Clayton Dunn, Black Springs—Nizam.



## A NEW NOXIOUS WEED.

### THREE-CORNERED GARLIC (*ALLIUM TRIQUETRUM*).

[By EDGAR W. PRITCHARD, Dip. Econ., Botanical Assistant.]

The plant which is shown in the accompanying photographs is a native of Europe and was imported into Australia in the early days as a garden flower. Its strong garlic odor, however, makes it objectionable in many ways. Thus we find it all round the suburbs of Adelaide, and also in many country towns, growing vigorously in heaps of garden refuse on vacant blocks and rubbish tips. It has thus existed as a garden escape for many years. But, recently, Mr. C. H. Beaumont, Horticultural Instructor, has found it growing in the open and spreading widely in pasture land, chiefly in moist places, near Ambleside and Mount Barker. We have also had a specimen sent in for identification from Naracoorte. This shows that it is practically certain to become a dangerous noxious weed if not completely exterminated wherever it appears. For while its



strong garlic odor and flavor protect it from browsing animals, it has the power of spreading surely, if slowly, both by seeds and bulbs. There is no reason, in fact, why it should not become as great a pest as onion weed, which has for a long time been on the list of declared noxious weeds.

Three-cornered garlic usually grows in dense clumps, the piece in the illustration having been separated out to show the parts distinctly. The general habit and also the flower very much resembles the common snowflake, but it has the points of the petals turned outwards instead of inwards. There is also a green line down the middle of each petal. It is called "triquetrum" or "three-cornered" because the flower stem



is triangular in section. The leaves also have much the same shape on account of a very prominent wing, which runs up on one side of the flat leaf blade. Besides this, it can be distinguished from most other garden plants by its strong garlic odor when bruised.

It should be destroyed ruthlessly and thoroughly wherever it appears. For it is quite possible, at this early stage, to eradicate it completely without any prohibitive expense. The best means is to pull the clumps by hand when the soil is saturated with water in the winter. They should then be thrown into heaps and burnt, when dry, in the late spring or autumn.

By this means, the whole of the plant, including the young bulbs, will come away, whereas with grubbing or cultivating they are only scattered and given more room to flourish. If the plants have become too thick to allow pulling by hand to be a payable proposition, then clean fallow for one or, perhaps, two years is the only remedy.

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## FUMIGATING TOMATO HOUSES WITH HYDRO-CYANIC ACID GAS TO DESTROY WHITE FLY (*Trialeuroides vaporarium*).

[By GEO. QUINN, Chief Horticultural Instructor.]

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The house should be made as airtight as possible prior to fumigating it, as the value of the fumigation is increased or diminished in proportion to the chance of retaining the fumes. The ingredients generally used in carrying out the pot method are:—Potassium cyanide, 98 per cent. purity; sulphuric acid (commercial strength); pure water.

The generating vessels usually adopted are glazed, large-mouthed earthenware jars, which must not be used afterwards for any other purpose owing to the poisonous character of the chemicals.

In calculating the charge, 1oz. of the cyanide, 1oz. (fluid) sulphuric acid, and 3ozs. rain water are suggested in fumigating each 250 cubic feet of the space enclosed in the house. This can be calculated by multiplying together the length, width, and height of the house to the top of the vertical sides; then multiplying the length by the width, and the result by the height of the apex of the gable above the side walls, together, and dividing this result by two. Add the quotient to the previously obtained sum of the length, width, and height of walls, and divide the answer by 250.

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For instance, a house measuring 100ft. long, 30ft. wide, with 4ft. vertical walls, and a rise of 4ft. in height from height of walls to apex of gable, would contain 18,000 cubic feet of space. This would need 72ozs. (4½lbs.) cyanide, 4½lbs. sulphuric acid, and 216ozs., or 10½ pints, of rain water to give it a fumigation.

One fumigation is not sufficient; it may kill all the winged or larval insects, but not the eggs. A second treatment two or three weeks later, when these eggs have hatched, should make a good job of the killing if the house be reasonably airtight. The procedure of fumigating is best done after the sun goes down or, at any rate, when it does not shine on to the house.

A number of 1gall.-sized glazed jars should be procured. These will each take about 8ozs. charge of cyanide and acid with the necessary water. A board lid is also necessary to lay loosely on top of the jar as soon as the cyanide is dropped into it. This avoids splashing and diffuses the fumes. When about to fumigate, mix the acid and water in the jars, taking great care to put *the water in first*, then gently stir with a stick whilst the acid is added slowly.

Place these jars at regular intervals along the main track through the house. The charges of cyanide should be wrapped or screwed up in one or two thicknesses of newspaper and be placed ready with the board lid alongside the pots. If the house is a long one, say, 100ft. or over, and has a door at each end, two persons should do the charging, both starting near to the middle, and moving back towards their respective doorways, simultaneously dropping the papers containing the cyanide into the pots, clapping on the lids as quickly as possible as they pass out of the house, and close the doors, which have been left wide open whilst the men are in the house. The house should be kept shut up for not less than one hour, but may be left longer, and afterwards both doors and any other available vents at the ends or sides should be opened for an hour, particularly if there is no breeze blowing, before anyone enters.

When the pots are removed, the residues in them should be buried deeply, but not close to trees or other crop plants. The pots should be washed out carefully at the same time, and be stored upside down where no one can handle or make use of them. It is a good plan to twist a galvanized wire handle around the neck of each one to avoid having to hold the pot directly with the hands. This precaution is desirable to avert the burning action of any dilute acid, as well as to avoid the poisonous nature of the cyanide.

The utmost care is required in handling and storing cyanide and sulphuric acid. The fumes of cyanide must not be breathed in; hence, keep the nostrils away when opening cyanide containers and charging or handling generators if any of the gas is still evolving.

The hands must not be put to the mouth when handling cyanide, and all weighing and cracking—the lumps used should be from the size of a pea to a walnut—should be done in the open air with a handkerchief or some protection against spattered chips or particles of the poison reaching the mouth. Pieces the size of a small seed will poison fowls, &c., and a man could collect enough particles under his finger nails to poison himself if conveyed to the mouth. Hence, the need for care and cleanliness when it is handled, always washing the hands immediately afterwards.

The sulphuric acid is very corrosive to the skin or clothing, hence, care must be taken to avoid splashes. If any burns occur, promptly sponge the spots with liquid ammonia or use carbonate of soda or even lime to neutralise the acid.

There are other methods of generating hydrocyanic acid gas, and possibly the flake form of calcium cyanide, which needs only to be placed in drills made in the damp soil between the rows of plants to cause an evolution of the gas, would prove effective and be more readily handled if it were available locally.



## THE HILLS HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                 |                      |                       | Butterfat.            |                      |                       | Average Test. |
|----------|------------------------------|------------------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|
|          |                              |                              | Per Herd during Sept. | Per Cow during Sept. | Per Cow July to Sept. | Per Herd during Sept. | Per Cow during Sept. | Per Cow July to Sept. |               |
|          |                              |                              | Lbs.                  | Lbs.                 | Lbs.                  | Lbs.                  | Lbs.                 | Lbs.                  | %             |
| 7/D ...  | 26                           | 20.07                        | 17,299½               | 665.36               | 1,920.92              | 723.85                | 27.84                | 79.93                 | 4.18          |
| 7/E ...  | 27.33                        | 19.17                        | 17,990½               | 658.29               | 1,729.20              | 759.54                | 27.79                | 70.44                 | 4.23          |
| 7/H ...  | 7                            | 5.23                         | 5,749                 | 821.28               | 1,857.55              | 257.63                | 36.80                | 84.91                 | 4.48          |
| 7/J ...  | 19.60                        | 15.67                        | 9,923½                | 506.30               | 1,505.38              | 473.65                | 24.17                | 71.64                 | 4.77          |
| 7/K ...  | 18                           | 11.43                        | 13,206½               | 1,015.85             | 1,958.41              | 584.03                | 44.93                | 85.89                 | 4.42          |
| 7/L ...  | 30.90                        | 19.33                        | 16,485½               | 533.51               | 1,009.53              | 792.67                | 25.65                | 48.56                 | 4.81          |
| 7/O ...  | 19.76                        | 16.17                        | 11,264½               | 570.17               | 1,101.95              | 521.58                | 26.40                | 53.46                 | 4.63          |
| 7/S ...  | 14                           | 14                           | 10,875                | 776.78               | 2,166.09              | 577.54                | 41.25                | 115.84                | 5.81          |
| 7/T ...  | 10                           | 9.97                         | 7,955                 | 795.50               | 1,653.25              | 331.52                | 33.15                | 68.73                 | 4.17          |
| 7/V ...  | 12                           | .5                           | 60                    | 5.00                 | 90.17                 | 3.36                  | .28                  | 4.86                  | 5.60          |
| 7/W ...  | 20                           | 13.60                        | 12,109                | 605.45               | 1,352.96              | 530.61                | 26.53                | 61.47                 | 4.38          |
| 7/X ...  | 14.17                        | 10.97                        | 11,736                | 828.23               | 1,922.57              | 481.08                | 33.95                | 78.22                 | 4.10          |
| 7/Y ...  | 15.60                        | 9.77                         | 6,315½                | 404.84               | 1,006.13              | 310.53                | 19.91                | 49.21                 | 4.92          |
| 7/Z ...  | 10                           | 8                            | 4,695                 | 469.50               | 1,478.75              | 211.94                | 21.19                | 65.71                 | 4.51          |
| 7/AA ... | 7                            | 5.33                         | 2,977                 | 425.29               | 1,040.86              | 158.31                | 22.62                | 53.60                 | 5.32          |
| 7/BB ... | 14.10                        | 8.40                         | 8,496                 | 602.55               | 1,369.81              | 344.64                | 24.44                | 54.66                 | 4.06          |
| 7/DD ... | 11.80                        | 10.90                        | 10,398½               | 881.23               | 1,889.87              | 518.67                | 43.96                | 94.58                 | 4.99          |
| 7/EE ... | 28                           | 23.80                        | 13,362                | 477.21               | 1,106.54              | 557.37                | 19.91                | 46.60                 | 4.17          |
| 7/FF ... | 10.27                        | 9.23                         | 11,572½               | 1,126.73             | 2,518.69              | 498.97                | 48.58                | 107.86                | 4.31          |
| 7/GG ... | 12                           | 8.67                         | 4,269                 | 355.75               | 801.55                | 208.70                | 17.39                | 41.14                 | 4.89          |
| 7/HH ... | 17                           | 14                           | 9,465                 | 556.76               | 1,545.38              | 423.25                | 24.90                | 66.21                 | 4.47          |
|          |                              |                              |                       |                      | Aug.-Sept.            |                       |                      | Aug.-Sept.            |               |
| 7/II ... | 12.23                        | 11.60                        | 8,017                 | 655.51               | 1,283.15              | 389.92                | 31.88                | 61.57                 | 4.86          |
| Means .  | 15.99                        | 12.08                        | 9,737.34              | 609.00               | 1,474.60              | 439.06                | 27.46                | 66.19                 | 4.51          |

## RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         |                          | Butterfat.               |                         |                          | Average Test. |
|----------|------------------------------|------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during October. | Per Cow during October. | Per Cow July to October. | Per Herd during October. | Per Cow during October. | Per Cow July to October. |               |
|          |                              |                              | Lbs.                     | Lbs.                    | Lbs.                     | Lbs.                     | Lbs.                    | Lbs.                     | %             |
| 7/D ...  | 26                           | 22.65                        | 20,311                   | 781.20                  | 2,702.12                 | 853.12                   | 32.81                   | 112.74                   | 4.18          |
| 7/E ...  | 26                           | 23.13                        | 25,019½                  | 962.29                  | 2,691.49                 | 1,031.75                 | 39.68                   | 110.12                   | 4.12          |
| 7/H ...  | 7                            | 6                            | 6,990½                   | 998.64                  | 2,856.19                 | 322.53                   | 46.08                   | 130.99                   | 4.61          |
| 7/J ...  | 20.23                        | 16.35                        | 13,572                   | 670.88                  | 2,176.26                 | 618.87                   | 30.59                   | 102.23                   | 4.56          |
| 7/K ...  | 14.74                        | 13.74                        | 15,950                   | 1,082.06                | 3,040.47                 | 670.51                   | 45.49                   | 131.38                   | 4.20          |
| 7/L ...  | 31                           | 23.19                        | 21,398½                  | 689.64                  | 1,699.17                 | 997.41                   | 32.15                   | 80.71                    | 4.66          |
| 7/O ...  | 20.35                        | 18.35                        | 14,442½                  | 709.70                  | 1,811.65                 | 680.08                   | 33.42                   | 86.88                    | 4.71          |
| 7/S ...  | 14                           | 14                           | 11,361½                  | 811.53                  | 2,977.82                 | 589.94                   | 42.14                   | 157.98                   | 5.19          |
| 7/T ...  | 10                           | 10                           | 8,184                    | 818.40                  | 2,471.65                 | 338.88                   | 33.89                   | 102.62                   | 4.14          |
| 7/Y ...  | 19.03                        | 14.94                        | 11,509½                  | 604.81                  | 1,610.94                 | 545.15                   | 28.65                   | 77.86                    | 4.74          |
| 7/W ...  | 20                           | 18.55                        | 19,841½                  | 992.08                  | 2,345.04                 | 861.17                   | 43.06                   | 104.53                   | 4.34          |
| 7/X ...  | 16                           | 15.16                        | 16,287                   | 1,017.93                | 2,940.50                 | 689.71                   | 43.11                   | 121.33                   | 4.23          |
| 7/V ...  | 9.68                         | .87                          | 1,161                    | 119.94                  | 210.11                   | 46.29                    | 4.78                    | 9.64                     | 3.99          |
| 7/Z ...  | 10                           | 7.55                         | 3,553                    | 355.30                  | 1,834.05                 | 167.87                   | 16.79                   | 82.50                    | 4.72          |
| 7/AA ... | 7.42                         | 5.68                         | 4,354                    | 586.78                  | 1,627.64                 | 222.89                   | 30.04                   | 83.64                    | 5.12          |
| 7/BB ... | 15                           | 11.29                        | 11,883½                  | 794.32                  | 2,164.13                 | 479.69                   | 32.09                   | 86.75                    | 4.02          |
| 7/DD ... | 12                           | 11                           | 10,710                   | 892.54                  | 2,782.41                 | 508.24                   | 42.35                   | 136.93                   | 4.75          |
| 7/EE ... | 28                           | 25.16                        | 19,446½                  | 694.52                  | 1,801.06                 | 817.31                   | 29.19                   | 75.79                    | 4.20          |
| 7/FF ... | 10.52                        | 10.52                        | 12,157                   | 1,155.52                | 3,674.21                 | 520.49                   | 49.48                   | 157.34                   | 4.28          |
| 7/GG ... | 12.35                        | 10.48                        | 9,362½                   | 758.64                  | 1,560.19                 | 460.66                   | 37.33                   | 78.47                    | 4.93          |
| 7/HH ... | 16.01                        | 15.10                        | 11,238½                  | 676.01                  | 2,221.99                 | 503.51                   | 30.31                   | 96.52                    | 4.48          |
|          |                              |                              |                          |                         | Aug.-Oct.                |                          |                         | Aug.-Oct.                |               |
| 7/II ... | 13                           | 13                           | 9,672                    | 744.00                  | 2,027.15                 | 456.85                   | 35.14                   | 96.71                    | 4.72          |
| Means .  | 16.32                        | 13.94                        | 12,654.82                | 775.65                  | 2,261.08                 | 562.86                   | 34.50                   | 101.16                   | 4.45          |



## NARRUNG HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1930.

| Herd No.   | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         | Butterfat.               |                         | Average Test. |
|------------|------------------------------|------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|---------------|
|            |                              |                              | Per Herd during October. | Per Cow during October. | Per Herd during October. | Per Cow during October. |               |
|            |                              |                              | Lbs.                     | Lbs.                    | Lbs.                     | Lbs.                    | %             |
| 5/C.....   | 30                           | 25-65                        | 19,413½                  | 647-12                  | 932-60                   | 31-09                   | 4-80          |
| 5/D.....   | 32                           | 28-48                        | 20,722                   | 647-56                  | 1,053-68                 | 32-93                   | 5-08          |
| 5/E.....   | 37-61                        | 32-77                        | 23,886                   | 635-10                  | 1,186-14                 | 31-54                   | 4-97          |
| 5/J.....   | 25                           | 24-06                        | 14,637½                  | 585-50                  | 792-04                   | 31-68                   | 5-41          |
| 5/O.....   | 25-39                        | 24-39                        | 21,131                   | 832-25                  | 1,115-70                 | 43-94                   | 5-28          |
| 5/R.....   | 44-03                        | 40                           | 23,517½                  | 534-12                  | 1,051-51                 | 23-88                   | 4-47          |
| 5/S.....   | 30                           | 30                           | 21,038½                  | 701-12                  | 1,040-83                 | 34-69                   | 4-95          |
| 5/T.....   | 22-29                        | 18-90                        | 15,384½                  | 690-19                  | 747-70                   | 33-54                   | 4-86          |
| 5/U.....   | 19-32                        | 17-58                        | 17,631½                  | 912-60                  | 820-31                   | 42-46                   | 4-65          |
| 5/Y.....   | 27-42                        | 24-32                        | 19,432                   | 708-68                  | 989-90                   | 36-10                   | 5-09          |
| 5/Z.....   | 29-16                        | 29-16                        | 28,978                   | 993-76                  | 1,348-14                 | 46-23                   | 4-65          |
| 5/AA.....  | 17-58                        | 12-90                        | 6,599                    | 375-37                  | 358-94                   | 20-42                   | 5-44          |
| 5/CC.....  | 34-42                        | 33-03                        | 23,959½                  | 696-09                  | 1,051-03                 | 30-54                   | 4-39          |
| 5/DD.....  | 22                           | 19-74                        | 14,168½                  | 644-02                  | 721-44                   | 32-79                   | 5-09          |
| 5/EE.....  | 16-55                        | 14-87                        | 13,222                   | 798-91                  | 651-61                   | 39-37                   | 4-93          |
| 5/II.....  | 28                           | 27-52                        | 24,290½                  | 867-52                  | 1,123-66                 | 40-13                   | 4-63          |
| 5/JJ.....  | 27-26                        | 27                           | 25,683½                  | 942-16                  | 1,202-39                 | 44-11                   | 4-68          |
| 5/KK.....  | 22-26                        | 19-19                        | 12,021½                  | 540-05                  | 549-50                   | 24-69                   | 4-57          |
| 5/MM.....  | 13                           | 11                           | 8,587                    | 660-54                  | 430-57                   | 33-12                   | 5-02          |
| 5/NN.....  | 27                           | 20-35                        | 17,058½                  | 631-80                  | 781-78                   | 28-05                   | 4-58          |
| 5/OO.....  | 21                           | 17-23                        | 13,846½                  | 659-36                  | 681-01                   | 32-43                   | 4-92          |
| Means..... | 26-25                        | 23-72                        | 18,343-02                | 698-73                  | 887-16                   | 33-79                   | 4-84          |

## LAKE ALBERT HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         |                              | Butterfat.               |                         |                              | Average Test. |
|----------|------------------------------|------------------------------|--------------------------|-------------------------|------------------------------|--------------------------|-------------------------|------------------------------|---------------|
|          |                              |                              | Per Herd during October. | Per Cow during October. | Per Cow December to October. | Per Herd during October. | Per Cow during October. | Per Cow December to October. |               |
|          |                              |                              | Lbs.                     | Lbs.                    | Lbs.                         | Lbs.                     | Lbs.                    | Lbs.                         | %             |
| 6/B....  | 20                           | 19-61                        | 19,425                   | 971-25                  | 4,710-10                     | 811-39                   | 40-47                   | 197-10                       | 4-18          |
| 6/C....  | 28                           | 28                           | 23,327½                  | 833-12                  | 6,269-44                     | 915-35                   | 32-69                   | 265-82                       | 3-92          |
| 6/E....  | 20-48                        | 18-48                        | 14,183                   | 692-53                  | 4,293-47                     | 564-83                   | 27-58                   | 172-85                       | 3-98          |
| 6/F....  | 25                           | 24-61                        | 23,467                   | 938-68                  | 6,919-31                     | 1,112-56                 | 44-50                   | 322-53                       | 4-74          |
| 6/I....  | 18                           | 16-29                        | 15,505                   | 799-89                  | 4,329-97                     | 639-41                   | 33-06                   | 182-49                       | 4-16          |
| 6/Q....  | 22                           | 20-48                        | 12,520                   | 569-09                  | 4,851-68                     | 862-91                   | 30-14                   | 238-82                       | 5-28          |
| 6/R....  | 22                           | 18-61                        | 11,630½                  | 528-66                  | 3,686-23                     | 634-09                   | 28-82                   | 196-24                       | 5-45          |
| 6/U....  | 26-45                        | 15-55                        | 9,886                    | 373-76                  | 2,921-34                     | 451-43                   | 17-07                   | 125-38                       | 4-57          |
| 6/W....  | 26-35                        | 22-03                        | 13,138                   | 495-17                  | 5,348-82                     | 617-71                   | 23-28                   | 250-28                       | 4-70          |
| 6/X....  | 29-29                        | 19-61                        | 20,529                   | 700-24                  | 8,174-67                     | 794-67                   | 27-10                   | 327-86                       | 3-87          |
| 6/Y....  | 20                           | 16-58                        | 11,312                   | 565-60                  | 4,746-20                     | 487-20                   | 24-36                   | 206-15                       | 4-31          |
| 6/BB.... | 18                           | 13-65                        | 10,315                   | 573-06                  | 3,040-86                     | 425-57                   | 23-64                   | 134-88                       | 4-13          |
| 6/DD.... | 31-52                        | 19-52                        | 9,896                    | 313-96                  | 4,658-37                     | 416-92                   | 18-23                   | 207-36                       | 4-21          |
| 6/EE.... | 47-77                        | 38-03                        | 24,420½                  | 510-71                  | 5,600-49                     | 1,070-12                 | 22-39                   | 248-92                       | 4-42          |
| 6/FF.... | 26                           | 21-03                        | 17,040½                  | 655-41                  | 4,637-06                     | 768-35                   | 29-56                   | 205-26                       | 4-50          |
| 6/II.... | 36                           | 28-48                        | 23,409½                  | 650-26                  | 6,266-91                     | 987-17                   | 27-42                   | 288-31                       | 4-22          |
| 6/JJ.... | 21                           | 17-42                        | 9,235½                   | 489-78                  | 6,090-02                     | 437-83                   | 20-85                   | 284-00                       | 4-74          |
| 6/KK.... | 25-84                        | 16-61                        | 12,867½                  | 497-97                  | 5,994-95                     | 523-15                   | 20-25                   | 259-70                       | 4-07          |
| 6/LL.... | 22-42                        | 18-55                        | 14,650½                  | 653-45                  | 5,860-39                     | 582-00                   | 25-94                   | 241-01                       | 3-97          |
| 6/MM.... | 15                           | 12-77                        | 9,133½                   | 608-90                  | 5,047-56                     | 443-16                   | 29-54                   | 242-00                       | 4-86          |
| 6/NN.... | 19                           | 14-48                        | 5,998                    | 315-68                  | 3,857-58                     | 281-56                   | 14-82                   | 175-91                       | 4-69          |
| 6/OO.... | 19                           | 13-42                        | 9,542                    | 502-21                  | 5,823-90                     | 425-25                   | 22-38                   | 260-61                       | 4-46          |
| Means..  | 24-52                        | 19-72                        | 14,610-52                | 596-21                  | 5,220-13                     | 638-75                   | 26-07                   | 231-76                       | 4-37          |



## AGRICULTURAL BUREAU CONFERENCES.

### EYRE PENINSULA—(KIMBA.)

A Conference of Branches situated on the eastern side of Eyre Peninsula was held at Kimba on October 6th under the auspices of the Kelly Branch.

Mr. C. Freeth presided over the Conference, which was formally opened by Mr. P. H. Jones (Advisory Board of Agriculture). Mr. Jones referred to the valuable part which Conferences played in the agricultural development of South Australia. Representatives of Branches were not only given an opportunity of meeting members of other Branches, but they were also able to seek the opinion and advice of technical officers of the Department on problems which constantly confront the farmer. He paid a tribute to the work of the Agricultural Instructors and stated that as a member of the Advisory Board of Agriculture he was able to obtain first-hand information as to the valuable work which was being accomplished by these officers. He was convinced that, with the present grave position of the wheat and wool markets, the time was now opportune for stimulating these industries by scientific methods of production. The farming of districts represented at the Conference must necessarily continue as a wheat-growing proposition. In this respect it would be difficult to assess the full value to farmers of such varieties of wheat as Ford, Daphne, Caliph, Sultan, and Felix, all of which were products of Roseworthy College. In fact, of the nine most extensively grown wheats at the present time, five originated at Roseworthy. Work like this should be encouraged to the utmost.

Papers were read by Mr. R. F. Mayfield (Kelly) on "Some Problems of the Eyre Peninsula Farmers"; Mr. J. S. Atkinson (Kelly), "Wheatgrowing and National Welfare"; Mr. J. E. Beinke (Kelly), "Growing Wheat under a Low Rainfall"; Mr. S. C. Johnson (Pinkawillinie), "The Conservation of Fodder"; and Mr. T. Harris (Kelly), "Poultry on the Farm."

Numerous questions were asked, and replies given by Prof. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director), R. H. F. Macindoe (Deputy Chief Inspector of Stock), and H. B. Barlow (Chief Dairy Instructor).

Addresses were given by Messrs. W. J. Spafford on "Wheat and its Diseases and Means of Combating same in Mallee Districts" and Mr. H. B. Barlow on "Dairy Cattle on Mallee Farms." Mr. Spafford also gave a review of experiments with varieties of wheats in mallee country.

The following resolutions were carried:—

1. "That the next Conference be held at Cleve."
2. "That this Conference strongly protests against the increased exchange on cheques on Eyre Peninsula."

### CONFERENCE AT WUDINNA.

On October 9th a Conference, embracing all Branches on Eyre Peninsula, was held at Wudinna, when Mr. A. W. H. Barns presided over a large attendance of representatives from many parts of the Conference district.

The Conference was opened by Mr. P. H. Jones, who stated that never in the history of primary production was there more need than now for strict economical farm management. He was of opinion that all members of the Bureau should be loyal in their support for a continuance of departmental guidance, as there were few who failed to recognise the difficulties which hampered the State, and in South Australia particularly primary production was the only avenue of escape. On a previous visit he had referred



to the important part which the newer areas would play in the production of the State and, although seasonal conditions had seriously handicapped the yields, he was confident that, with a return of better rainfall and with the continued improvement in farming methods, that expectancy would be realised. Many farmers had secured quite satisfactory results in respect to the maximum production of their holdings, but he drew attention to the fact that in county Buxton, in 1926-27, 57 farmers secured a return approximating the average (9.54bush.), 97 obtained over the average and up to 18bush., while 42 farmers secured less than the average, and some even down as low as under 3bush.

Papers were read by Mr. A. J. Shepherd (Wudinna) on "Farm Economy," and Mr. E. H. Edmonds (Pygery) on "Cost of Production."

Questions were asked by various Branches, replies being given by Prof. Perkins (Director of Agriculture), W. J. Spafford (Deputy Director), H. B. Barlow (Chief Dairy Instructor), and R. H. F. Macindoe (Deputy Chief Inspector of Stock).

At an evening session addresses were given by Mr. Barlow on "Dairy Cattle on Mallee Farms," and Mr. Macindoe on "Ailments and Injuries of Livestock."

The following resolutions were carried:—

1. "That the next Conference be held at Wudinna."
2. "That the Department of Agriculture be requested not to hold Conferences or visiting days at the Experimental Farm on public holidays."
3. "That the Department of Agriculture be requested to supply two pure bred milking Shorthorn cows to the Minnipa Experimental Farm for the purpose of breeding stock for distribution throughout this and the surrounding districts."
4. "That the South Australian railways be requested to reduce the freight on wheat and super on the Eyre Peninsula lines by 25 per cent. to compensate for the low price of wheat."
5. "That this Conference requests the Advisory Board of Agriculture to approach the wheat merchants with a request to allow farmers to sell their wheat in sound second-hand bags."
6. "That Branches on Eyre Peninsula co-operate in an endeavor to present a request to superphosphate manufacturers and distributors on Eyre Peninsula to allow farmers a reduction in the price of super of the amount of commission paid to agents, provided that farmers sent in their orders direct to manufacturers."
7. "That the Government devise some scheme of encouraging the breeding of draught horses in the State."
8. "That the Government be approached to assist the farmers by granting them concession freights on approved flock rams procured for the purpose of building up their flocks."

### NON-IRRIGATED FRUIT AREAS CONFERENCE.

Branches of the Agricultural Bureau situated in the non-irrigated fruit areas of the State held their Conference at Angaston on November 4th.

Mr. W. Patching presided over the Conference, and in the course of the opening address, Mr. H. N. Wicks (Vice-Chairman of the Advisory Board of Agriculture) stated that, whilst nobody would deny the unenviable position of many agriculturists, he was firmly of the opinion that the fruitgrower was in an even more unenviable position. Everywhere there was a desire for more research work to solve some of the pressing problems of the growers, and it was a matter for extreme regret that at such a time the financial position was such as would not permit of these necessary investigations. Present indications pointed to the fact that the fruitgrower would have to take lower prices for his produce and, with this aspect in front of him, the only solution of the problem seemed to be in the direction of increased production.

Papers were read by Mr. W. Goldsack (Blackwood) on "Orchard Practices in America"; Mr. J. B. Harris (District Horticultural Instructor), "White Oil Spray



and Manuring of Apricot Trees'; Mr. F. E. Rix (Williamstown), "Profitable Utilisation of Waste Orchard Products."

Mr. W. C. Johnston (Agricultural Instructor) delivered an address on "Weeds of the District," and questions on a variety of subjects were answered by officers of the Department of Agriculture.

Resolutions were carried as under:—

1. "That the next Conference be held at Clare."
2. "That this Conference considers that all petrol used on farms and orchards should be free of all tax, and, if not, a rebate should be allowed."
3. "That this Conference, representing the non-irrigated fruitgrowing areas, recommends to the Dried Fruits Board that 'buck' currants, used in manufacturing processes not competing with other dried fruits, be allowed to be sold without comprising portion of either home or export quota."

## If you can't grow vegetables

*and you can't buy them, you will  
certainly need a stock of Swallow  
and Ariell's Compressed Vegetables.*



**THEY'RE** equal in every way to fresh, as only water is removed—true flavour is retained. One pound goes as far as ten of the fresh, so that they're easily carried. Store them as long as you like—with a few packets at hand you need never be short of health-giving vegetables.

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Carrots, Parsnips, Turnips, Onions, and mixed—Compressed and supplied in  $\frac{1}{4}$ lb. cartons and 1lb. tins.

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Mixed Vegetables—Loose, in  $1\frac{1}{2}$ oz. packets.

# SWALLOW & ARIELL'S COMPRESSED VEGETABLES



## ADVISORY BOARD OF AGRICULTURE.

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A meeting of the Advisory Board of Agriculture was held on Wednesday, November 26th, 1930, when the following members were present:—Messrs. H. N. Wicks (Vice-Chairman), A. M. Dawkins, P. J. Baily, A. J. Cooke, P. H. Jones, S. Shepherd, R. H. Martin, Dr. A. E. V. Richardson (Director Waite Research Institute), Mr. W. R. Birks (Principal Roseworthy Agricultural College), Professor Arthur J. Perkins (Director of Agriculture), and Mr. H. C. Pritchard (Secretary).

Apologies were received from Messrs. F. Coleman, J. W. Sandford, H. S. Taylor, and A. L. McEwin.

*New Member.*—The Chairman extended a cordial welcome to Mr P. J. Baily as a member of the Board. Mr. Baily was appointed in lieu of Mr. H. A. Mayfield, who had resigned.

*Controlling Fruit Crops.*—Mr. Geo. Quinn (Chief Horticultural Instructor) submitted the following report on a resolution of the last Conference of Hills Branches that steps be taken to investigate the possibility of controlling fruit crops by systematic manuring:—“From what I can recall of the discussion, this resolution and the subject dealing with the change of wood buds into fruit buds are relevant to each other, both having for their object the regulating of the cropping habits of apple trees. I understand Mr. Wicks, of Balhaunah, and Mr. Basey, of Cherry Gardens, have been manuring small plots of apple trees for the last year or so with sulphate of ammonia with this object in view. We have also added this treatment to a plot of apple trees devoted to pruning and thinning trials at Blackwood Orchard, and which have crop regulation as their objective. The unknown factors, however, seem to be what is the best fertiliser to use, and when, and how should it be applied to the land. Assuming nitrogen to be the crop-limiting factor with apple trees—as we believe it to be with orange trees—we are in doubt as to when it should be applied to most effectively meet the needs of the developing flower buds. In the plots or rows consisting of equal numbers of apple, pear, and peach trees growing in the permanent manure trials at Blackwood Experiment Orchard since 1908, the results from annual spring dressings of fertilisers, whether applied singly or in combinations, have thrown very little, if any, light on this subject up to date. Possibly, our dressings have not been sufficiently heavy or have not been applied in the best manner or at the most desirable time to assure the roots receiving benefit therefrom. Anyway, up to the present we must confess to appearing to be ‘groping in the dark’ in respect to manuring deciduous fruit trees when working along ordinary prescribed channels of procedure.”

*Change of Wood Buds into Fruit Buds.*—Mr. Quinn submitted the following report on this matter, which was the subject of a resolution passed at the Hills Conference:—“The matter of the determination of the period of the year when the flower buds on fruit trees begin to differentiate from the ordinary leaf buds has been under scientific investigation in U.S.A. and Europe from time to time during the past 30 years. Those directed towards the apple in U.S.A. have been carried out at the respective University Experiment Stations as follows:—By Professor Goff, of Wisconsin, in 1899, on a variety called Hoadley; by Drinkard, of Virginia, in 1909, on Duchess of Oldenburg apple; by Bradford, of Oregon, on Yellow Newtown in 1912; and by Tufts and Morrow, of California, on the Gravenstein apple in 1923. More latterly, Dr. Swarbrick, of the Long Ashton Horticultural Research Station, Bristol, England, conducted further research into this subject. In all of these researches the histological structures of the buds were carefully studied, and micro-photographs prepared showing in clear detail the various stages of differentiation and development of the primordia of the floral organs. Summed up, differentiation was first noticed in the flower buds of the respective apples by the



above-named investigators on the following dates:—By Goff, June 30th, 1899; Drinkard, June 30th, 1909; Bradford, early July, 1912; Tufts and Morrow, June 11th, 1923; Swarbrick, late June, 1927. Although, as far as I can ascertain, no work has been done in Australia on this phase of apple bud growth, these periods indicate that we may expect differentiation of the flower buds to be detectable in Australia towards the end of December or early in January. As, however, our climate, and the varieties of apples we grow, may each exercise some influence on these developments, considerable variations in the equivalents of the American or European dates may be eventually found. A study of this nature involves not only a good working knowledge of the morphology of the apple blossoms, but necessitates the possession of great skill in the technique of cutting, staining, and generally preparing vegetable tissues for microscopic specimens to enable critical examinations to be conducted. In view of these facts, this is work for a botanist trained in vegetable histology and microscopic technique. If the Director of the Waite Agricultural Research Institute could allocate the study to a trained assistant, I could arrange to collaborate by the provision of seasonal material from the Blackwood Experimental Orchard, where trees of a very wide range of varieties of apples or other fruits are available. It would seem that a more exact knowledge of the times of the year when the various stages of development take place in flower buds in apples may prove very valuable in formulating any experimental work, aiming at the control of the irregular cropping habits exhibited by apple and other fruiting trees."

Dr. Richardson promised to collaborate with the Department of Agriculture in conducting experiments as proposed. He suggested that Mr. Quinn's staff gather specimens of twigs and retain them in a fixing bath at the Blackwood Experimental Orchard until the investigations could be commenced.

*State Bank at Alawoona.*—The resolution of the Murray Lands Conference that a branch of the State Bank be established at Alawoona to help the development of the district, was referred to the State Bank. The General Manager intimated that the matter of opening a branch of the bank at Alawoona had been reconsidered, and it had been decided to take no action at this stage owing to existing financial conditions.

*Destruction of Foxes.*—A report had been obtained from the Vermin Board with reference to the Hills Conference resolution requesting that the month of March be set aside for the simultaneous destruction of foxes, and that it be an offence to liberate any fox. The report, in effect, states that foxes are included as vermin in the definition of "vermin" in the Vermin Act. The Act provides that all district councils, vermin boards, and associated boards shall within their respective districts strictly enforce the provisions as to the destruction of vermin. Further, every owner and every occupier of any land shall at all times and at his own cost and expense destroy all vermin upon such land, and upon the half width of all roads adjoining the same. Any person who



Design No. 11.

## FRAMED HOUSES

READY TO ERECT.

SEND FOR CATALOGUE.

TIMBER

FOR EVERY JOB.

TERMS ARRANGED.

**COWELL BROS. & COY. LTD.,**  
ADELAIDE, NORWOOD (Head Office), and PORT ADELAIDE.



lets loose any vermin or permits any vermin to be let loose, in any part of the State, shall be liable to a penalty for each offence not exceeding £100 or to be imprisoned for a term not exceeding six months with hard labor. Vermin Acts provide for the simultaneous destruction of vermin. The periods fixed within the counties of Adelaide, Hindmarsh, and Sturt are from February 15th to March 14th, and from July 15th to August 14th in each year. The report was received, and the Secretary was asked to communicate same to the Mount Pleasant Branch, pointing out that possibly their requirements were already covered by the Act.

*Climatological Station at Wudinna.*—The request of the Wudinna Conference that Wudinna be reinstated as a climatological station was referred to the Divisional Meteorologist, who submitted a report on the subject, at the conclusion of which he stated that "while appreciating the point of view of Wudinna residents, I regret that limitations, imposed by economy, amount of telegraph business allowed, and also by the size of our weather bulletin, preclude the reinstatement of Wudinna in the list of daily telegraph rain reporting stations." The report was received, and the Secretary was asked to advise the Wudinna Branch accordingly.

*Division of Mallee Lands Conference District.*—On the motion of Mr. P. H. Jones, seconded by Mr. S. Shepherd, it was decided to accept the suggestion that the district be divided by a line running north and south between Halidon and Mindarie. That, it was considered, would give an almost equal division of Bureau Branches on each side, and would be convenient so far as distance of travelling to Conferences was concerned.

*Buck Currants.*—The following resolution was received from the Conference of Non-irrigated Fruitgrowing areas:—"That this Conference representing the Non-irrigated Fruitgrowing areas recommends to the Dried Fruits Board that buck currants be used in manufacturing processes not competing with other dried fruits and be allowed to be sold without comprising portion of either home or export quota." It was decided to refer the matter to the Dried Fruits Board.

*Export of Pig Meat.*—The following resolution was received from the Narridy Branch:—"That we ask the Advisory Board what has been done in regard to the exporting of pig meat from South Australia during the last two years." It was decided to advise the Branch that an experimental shipment was being prepared at present and to seek further information from the Victorian Department of Agriculture on shipments that had been made from that State.

*Concession Freights on Flock Rams.*—The Minister stated that no action will be taken in reference to the request of the Wudinna Conference that concessions be given for freights on approved flock rams.

*Experimental Farms.*—Petitions were received from residents at Mangalo, Wudinna, Ceduna, Cungi, Wirrulla, Minnipa, and other centres, requesting the Honorable Minister to conduct the Minnipa Experimental Farm on a commercial basis until such time as the financial condition of the State will warrant the resumption of experimental and seed wheat distributing operations. It was decided that a deputation consisting of Messrs. F. Coleman, A. M. Dawkins, R. H. Martin, and P. H. Jones, wait on the Minister of Agriculture regarding this matter.

It was decided not to take any further action in connection with a resolution of the Kyancutta Branch dealing with the closing of experimental farms.

*Agent's Commission on Superphosphate.*—As requested by the Board at the October meeting, Mr. Shepherd reported on the Wudinna Conference resolution as follows:—"With many others I feel that superphosphate should be distributed direct to the farmer without the unnecessary commissions to distributors and agents, which tend to restrict rather than augment the full use of this article. Acting on lines of direct supply to farmers, one small concern in Victoria has in three years of manufacture reached an output of 80,000 tons per annum. This concern operates as follows:—To their shareholders they make a rebate at a rate determined by profits on the basis of per ton per share, viz., every £5 share carries a rebate for one ton of super, which has



worked out at 7s. 10d. per share covering a period of three years. Assuming that the number of tons purchased by a shareholder is greater than the number of shares he holds, the balance purchased above the share quota participates in a minor rebate at the rate of 3s. per ton, and if the two quotas combined exceed 100 tons, a further rebate of 2s. 6d. per ton is allowed. Thus:—

|                                                     |     |         |
|-----------------------------------------------------|-----|---------|
| One ton for each share held would cost .. . . . . . | —   | £4 15 0 |
| Less—                                               |     |         |
| Cash on receipt of invoice .. . . . . .             | 5 0 |         |
| Rebate for 1930 (in 1929 it was 8s.) .. . . . . .   | 7 6 |         |
| If purchased in 100 ton lot .. . . . . .            | 2 6 |         |
|                                                     | —   | 0 15 0  |
| Net price per ton .. . . . . .                      |     | £4 0 0  |
| One ton above the share quota .. . . . . .          |     | 4 15 0  |
| Less—                                               |     |         |
| Cash on receipt of invoice .. . . . . .             | 5 0 |         |
| Minor rebate .. . . . . .                           | 3 0 |         |
| If purchased in 100 ton lot .. . . . . .            | 2 6 |         |
|                                                     | —   | 0 10 6  |
|                                                     |     | £4 4 6  |

(In both cases where the farmer returns the bag a corresponding 7s. 6d. per ton is deducted.)

The practice in South Australia has been to allow only 2s. 6d. per ton on receipt of invoice or 30 days and 5s. for cash with order. As "cash with order" is not a usual business practice with farmers, it means a gift of 2s. 6d. per ton to the distributors in addition to their trade allowance. The presence of an army of canvassers and a staff of unskilled inspectors does not add one ton to the aggregate consumption. While it might increase the individual factory output, according to the energy and popularity of the inspector, it must add to the cost. I feel that the delegates of the Wudinna Conference have ample grounds for complaint, and that the price could be considerably reduced, as the old established concerns should at least be able to beat the younger and probably less experienced concerns like that quoted above. Messrs. F. Coleman, S. Shepherd, and P. H. Jones were appointed to interview the superphosphate companies regarding this matter.

*Investigations into the cost of Wheat Growing.*—The Murray Lands Conference moved—"That the Department of Agriculture be requested to continue to carry on the work of investigating costs relating to the growing of wheat." This was referred to the Director of Agriculture, who supplied the following report:—"It is satisfactory to learn that the Murray Lands Branches are interested in the work we have been carrying out relative to the cost of growing wheat. In this connection I wish to point out that for eight successive seasons we have investigated this question on the Turretfield Experimental Farm, and whilst the results secured there are dependable, mainly because the manager is a very competent man, they nevertheless do not correspond to the average position on South Australian farms. At Turretfield both the cost of management and the cost of labor are paid for in cash at standard rates. On the average farm, little or no hired labor is availed of, the great bulk of the manual work being carried out by the farmer and his family. It is therefore extremely difficult to determine the actual cost of growing wheat in these circumstances, whilst it is comparatively a simple matter to determine the labor income of the farmer and his family. I may say that at the present time we are investigating the cost of growing wheat on one mallee farm, and



the results will be published shortly. My own opinion is, however, that in order to get really representative results on the subject, it would be necessary to keep the accounts of several individual farms placed in typical wheat-growing districts of the State, and in each case these accounts should be kept over periods of not less than three successive years. Roughly speaking, this would involve:—Six farms on Eyre Peninsula; three farms representative of the Lower North, including counties Victoria, Daly, Stanley, Burra, and Kimberley; three farms in counties Albert and Alfred; three farms in counties Russell, Buccleuch, and Chandos; three farms on Yorke Peninsula; three farms over the rest of the Central Statistical Division; three farms for counties Buckingham and Cardwell. This, of course, would involve some addition to the existing clerical staff, which I am afraid in present circumstances is very difficult to expect. I mention it, however, as an ideal in a very important matter, and I hope to have the support of the Board should it at any time prove possible to secure the required assistance. I may say that such investigations should not, in my opinion, be confined to wheat, but should be extended to all our major agricultural operations, together with any minor operations that appear to have economic importance for this State." The Board supported the views of Professor Perkins, and it was decided to bring the matter up in six months' time for consideration.

*Open Season for Opossums.*—The Hills Conference resolution requesting that there be no open season for opossums and that landholders be the only persons allowed to take opossums on their own property, was brought under the notice of the Minister, who intimated that under the present Act no person has any right to take opossums on any property without the consent of the owner or occupier, and there was no intention of having an open season for opossums for some time.

*Veterinary Officers.*—The following resolution was received from the Narridy Branch:—"That this Branch ask the Advisory Board of Agriculture what can be done in regard to the appointment of a veterinary officer to the Northern Areas?" It was decided to forward the resolution to the Honorable the Minister of Agriculture.

*Enforcement of Regulations Regarding Control of Codlin Moth.*—Resolution from Blackwood Branch:—"That the regulations relating to the control of codlin moth be vigorously enforced, with special reference to neglected orchards." It was decided to transmit the resolution to the Minister.

*Petrol Used on Farms.*—The Non-irrigated Fruit Conference considered that all petrol used on farms and orchards should be free from all tax, and if not, a rebate should be allowed. The matter was deferred until the next meeting.

*Next Meeting.*—It was decided that the next meeting of the Board be held on the last Wednesday in January.

*Life Membership.*—Life membership of the Agricultural Bureau was conferred upon Messrs. W. O. Eime and J. A. Pratt, members of the Blyth Branch.

*New Members.*—The following names were added to the rolls of existing Branches:—Pinnaroo Women's—Mrs. W. Williams, Mrs. Hill, Mrs. A. J. Young, Miss K. O'Loughlin; Wallala—R. Nottle, S. Morgan, P. Duncan; Mount Barker—A. A. Paech; Mypolonga—Arthur Milde; Modbury—R. E. Mortimer, B. C. Mortimer; Eudunda—C. W. E. Ziegeler, A. B. Sieber; Beetaloo Valley—A. Head, C. C. Cox; Parilla Women's—Mrs. R. Curtis; Strathalbyn—S. H. Foreman, R. M. Tucker; Yandiah—W. Huddleston; Laura—F. T. Acott, R. Cornish, T. A. Kleinig, J. Reichstein; Pinkawillinie—M. McMahon; Pygery—Wm. Foster, H. Woodrup; Mount Barker—L. Bell, O. Kuchel; Millicent Womens'—Mrs. H. Ey, Mrs. A. Oberlander, Mrs. T. Latter; Yantanabie—C. Olsen; Alawoona—P. Masters; Clare—H. F. Hicks; Cungenah—R. Robertson; Narridy—V. J. Button; Penola—H. B. Wilson; Greenock—E. Heinze, M. Bolt; Parilla Women's—Mrs. Andrews; Clarendon—A. White; Millicent—T. N. Bell, F. N. White, R. A. Hateley, L. Hateley, E. Hutchesson, C. Butchesson, L. Hutchesson; Warcowie—C. Wheadon, A. Faulkner, E. Sanders.



**DAIRY AND FARM PRODUCE MARKETS.**

A. W. SANDFORD & Co., LIMITED, reported on December 1st, 1930:—

**BUTTER.**—Production for the month of November kept up remarkably well, due to the fact of fairly frequent rains received keeping the feed going in some parts and preventing the rapid drying off in others. The quantities of cream and butter received at the various factories was heavier than for several seasons, and export of the surplus butter was made each week to London. Prices were lower than have ruled for many years past, and the same applies to all world markets, so that it was not unexpected. Fortunately, London buyers absorbed all offering, so that at no time was there a glut in any of the Australian centres. With the approach of warmer weather, supplies are now cutting back; but there should be sufficient butter produced locally for all local requirements—at any rate until the end of the year. Choicest creamery fresh butter in bulk, 1s. 1½d.; prints and delivery extra. Second and third grades, 11½d. (these prices are subject to the stabilization levies); best separators, 10d. to 11d.; well-conditioned store and collectors', 7½d. to 8½d. per lb.; pastry lots lower.

**EGGS.**—The production in this line also was well maintained, although the peak period was touched in October, and there has been a steady lessening since, which is only to be expected with the advance of the season. With the warmer weather approaching affecting the quality, and with packing for export almost finished, values weakened. Ordinary country eggs, hen 5½d. per dozen; duck, 6½d. per dozen; infertile higher.

**CHEESE.**—The South-Eastern factories this year have produced record quantities, which have been marketed in Adelaide and Victoria, and so far stocks have been kept fairly well cleared. Western Australian buyers have purchased fairly regularly each week from the Adelaide merchants, but now that State's operations are being limited each year with the increasing production within their own borders. New makes, large to loaf, 6½d. to 6½d. per lb.; semi-matured and matured, to 11d. per lb.

**ALMONDS.**—Slightly better supplies came to hand in November, and these were cleared to local purchasers and rates continued steady. Brandis, 7½d. to 8d.; mixed softshells, 7d. to 7½d.; hardshells, 4d. to 4½d.; kernels, 1s. 6d. to 1s. 7d. per lb.

**HONEY.**—The new season's "take" is being marketed now, and as there was a carry-over from the previous season, values weakened, and the demand continued very dull. Prime clear extracted in liquid condition, 3½d. to 3½d.; best quality candied lots, 2½d. to 3½d.; second grade, 1½d. to 2d.

**BEEWAX.**—Limited supplies came to hand and were cleared from week to week, values at present being 1s. 4½d. to 1s. 5½d. per lb., according to sample.

**BACON.**—As usual in the warmer weather, the consumption of bacon declines, but an improved demand is being shown for hams and bacon factory small goods, so that the output from the factories is being kept fairly well cleared. There was an easing in prices recorded in sympathy with the lower rates ruling for the live hogs. Best local sides, 9½d. to 10d.; best local factory cured middles, 9d. to 9½d.; large, 7½d.; local rolls, 9½d. to 10d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 2d.; local, 1s. to 1s. 0½d.; "Sugar Cane" brand lard in packets 11d., in bulk 10d. per lb. Local lard, 10½d. per lb. in prints.

**LIVE POULTRY.**—As usual with the nearer approach of Christmas, supplies of poultry are showing an increase, but a big proportion of the birds marketed, however, are not altogether suitable for table purposes, many consignments consisting of old and White Leghorn hens. So far the demand has kept up well, but buyers are keener for prime-conditioned stock than for the lighter sorts. Breeders would be well advised to fatten up stock before marketing, especially cockerels, turkeys, geese, and ducks, as it amply repays for the attention given in this way. We advise consigning. Crates loaned on application. As this is our last report for the year 1930, we would extend the best of Christmas greetings to all and wish that the year 1931 will be more prosperous for all concerned in this State. Prime roosters, 4s. 6d. to 5s. 6d.; nice-conditioned cockerels, 3s. 6d. to 4s. 3d.; fair-conditioned cockerels, 2s. 9d. to 3s. 4d.; chickens lower. Heavy weight hens, 3s. to 3s. 6d.; medium hens, 2s. 3d. to 2s. 9d.; light hens, 1s. 6d. to 2s.; couple of pens of weedy sorts lower. Geese, 4s. 6d. to 6s. 6d. Prime young Muscovy drakes, 4s. 6d. to 5s. 9d.; ducks, good conditioned, 3s. 9d. to 4s. 3d.; ducks, fair condition, 2s. 3d. to 3s.; ducklings lower. Turkeys, good to prime condition, 9d. to 1s. per lb. live weight; turkeys, fair condition, 7d. to 8½d. per lb. live weight; turkeys, fattening sorts, lower. Pigeons, 6½d. each.

**POTATOES.**—New Western Australian Delawares, 7s. to 8s. per cwt.

**ONIONS.**—New white, 6s. per cwt.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of November, 1930, also the average precipitation to the end of November, and the average annual rainfall.

| Station.                          | For Nov. 1930. | To end Nov. 1930. | Av'ge to end Nov. | Av'ge Annual Rain-fall. | Station.                      | For Nov. 1930. | To end Nov. 1930. | Av'ge to end Nov. | Av'ge Annual Rain-fall. |
|-----------------------------------|----------------|-------------------|-------------------|-------------------------|-------------------------------|----------------|-------------------|-------------------|-------------------------|
| <b>FAR NORTH AND UPPER NORTH.</b> |                |                   |                   |                         | <b>LOWER NORTH—continued.</b> |                |                   |                   |                         |
| Oodnadatta .....                  | 0.48           | 4.41              | 4.27              | 4.78                    | Brinkworth ....               | 0.33           | 11.79             | 14.89             | 16.01                   |
| Marree.....                       | 0.55           | 6.09              | 5.13              | 5.92                    | Blyth.....                    | 0.77           | 12.00             | 15.90             | 16.94                   |
| Farina .....                      | 0.81           | 6.34              | 5.88              | 6.53                    | Clare .....                   | 0.44           | 18.95             | 23.46             | 24.67                   |
| Copley .....                      | 0.65           | 7.20              | 7.16              | 8.04                    | Mintaro .....                 | 0.56           | 18.72             | 22.23             | 23.51                   |
| Beltana .....                     | 0.63           | 6.49              | 7.81              | 8.68                    | Watervale.....                | 0.65           | 16.63             | 25.82             | 27.24                   |
| Blinman .....                     | 0.94           | 8.10              | 11.14             | 12.12                   | Auburn .....                  | 0.61           | 17.85             | 22.98             | 24.12                   |
| Hookina .....                     | 0.51           | 8.20              | 10.37             | 11.85                   | Hoyleton .....                | 0.84           | 10.81             | 16.54             | 17.56                   |
| Hawker .....                      | 0.54           | 8.82              | 11.39             | 12.43                   | Balaklava .....               | 0.23           | 10.87             | 14.80             | 15.99                   |
| Wilson.....                       | 0.44           | 7.74              | 10.91             | 12.01                   | Port Wakefield .              | 0.37           | 8.51              | 12.41             | 13.08                   |
| Gordon .....                      | 0.43           | 7.90              | 9.83              | 10.89                   | Terowie .....                 | 0.48           | 7.87              | 12.40             | 13.58                   |
| Quorn .....                       | 0.72           | 8.34              | 12.66             | 13.60                   | Yarcowie .....                | 0.91           | 8.36              | 12.82             | 13.83                   |
| Port Augusta ...                  | 0.95           | 6.87              | 8.84              | 9.50                    | Hallett .....                 | 1.99           | 13.58             | 15.43             | 16.55                   |
| Bruce .....                       | 0.44           | 7.50              | 9.08              | 10.10                   | Mount Bryan ..                | 0.60           | 13.12             | 15.65             | 16.87                   |
| Hammond .....                     | 0.37           | 7.32              | 10.54             | 11.54                   | Koorunga .....                | 0.62           | 13.54             | 16.96             | 18.00                   |
| Wilmington .....                  | 0.49           | 9.75              | 16.74             | 17.78                   | Farrell's Flat ..             | 0.39           | 12.99             | 17.74             | 18.82                   |
| Willowie .....                    | 0.64           | 12.61             | 11.21             | 12.27                   | <b>WEST OF MURRAY RANGE.</b>  |                |                   |                   |                         |
| Melrose .....                     | 0.66           | 13.08             | 22.01             | 23.15                   | Manoora .....                 | 0.53           | 14.15             | 17.80             | 18.97                   |
| Booleroo Centre...                | 0.41           | 10.93             | 14.27             | 15.41                   | Saddleworth ...               | 1.07           | 16.43             | 18.58             | 19.65                   |
| Port Germein ...                  | 0.76           | 10.28             | 11.64             | 12.56                   | Marrabel .....                | 0.67           | 16.92             | 18.88             | 19.92                   |
| Wirrabara .....                   | 0.60           | 12.69             | 18.31             | 19.47                   | Riverton .....                | 0.93           | 15.89             | 19.89             | 20.86                   |
| Appila .....                      | 0.42           | 9.81              | 13.73             | 15.01                   | Tarlee .....                  | 0.76           | 14.92             | 17.20             | 18.16                   |
| Craddock .....                    | 0.44           | 8.41              | 10.01             | 11.00                   | Stockport .....               | 0.89           | 15.39             | 15.89             | 16.88                   |
| Carrieton .....                   | 0.45           | 9.37              | 11.37             | 12.47                   | Hamley Bridge .               | 0.46           | 12.99             | 15.67             | 16.67                   |
| Johnburg .....                    | 0.53           | 9.11              | 9.69              | 10.69                   | Kapunda .....                 | 0.95           | 16.18             | 18.83             | 19.92                   |
| Eurelia .....                     | 0.31           | 7.62              | 12.07             | 13.14                   | Freeling .....                | 0.48           | 13.77             | 17.01             | 18.03                   |
| Orroroo .....                     | 0.31           | 8.96              | 12.42             | 13.36                   | Greenock .....                | 0.64           | 17.00             | 20.69             | 21.76                   |
| Nackara .....                     | 0.77           | 9.78              | 10.38             | 11.71                   | Truro.....                    | 1.02           | 16.03             | 19.14             | 20.21                   |
| Black Rock .....                  | 0.49           | 8.50              | 11.63             | 12.57                   | Stockwell .....               | 1.27           | 17.86             | 19.16             | 20.30                   |
| Oodlawirra .....                  | 0.64           | 9.60              | —                 | *                       | Nuriootpa .....               | 0.89           | 17.78             | 19.54             | 20.74                   |
| Peterborough ...                  | 0.45           | 8.05              | 12.28             | 13.40                   | Angaston .....                | 1.09           | 18.67             | 21.36             | 22.58                   |
| Yongala .....                     | 0.58           | 10.08             | 13.41             | 14.57                   | Tanunda .....                 | 0.44           | 16.61             | 21.12             | 22.20                   |
| <b>NORTH-EAST.</b>                |                |                   |                   |                         | Lyndoch .....                 | 0.48           | 18.47             | 22.51             | 23.71                   |
| Yunta .....                       | 0.43           | 5.53              | 7.82              | 8.53                    | Williamstown...               | 1.17           | 22.47             | 26.57             | 27.84                   |
| Waukaringa .....                  | 0.32           | 4.85              | 7.42              | 8.38                    | <b>ADELAIDE PLAINS.</b>       |                |                   |                   |                         |
| Mannahill .....                   | 0.36           | 6.98              | 7.55              | 8.39                    | Owen .....                    | 0.55           | 13.73             | —                 | 14.22                   |
| Cockburn .....                    | 0.83           | 4.98              | 7.31              | 8.04                    | Mallala .....                 | 0.44           | 12.00             | 15.83             | 16.77                   |
| Broken Hill, N.S.W.               | 0.43           | 6.66              | 8.79              | 9.71                    | Roseworthy .....              | 0.65           | 14.42             | 16.51             | 17.46                   |
| <b>LOWER NORTH.</b>               |                |                   |                   |                         | Gawler .....                  | 0.48           | 13.70             | 18.16             | 19.14                   |
| Port Pirie .....                  | 0.41           | 8.62              | 12.46             | 13.38                   | Two Wells .....               | 0.43           | 11.56             | 14.98             | 15.88                   |
| Port Broughton ..                 | 0.44           | 10.00             | 13.34             | 14.08                   | Virginia .....                | 0.54           | 13.47             | 16.30             | 17.30                   |
| Bute .....                        | 0.24           | 10.70             | 14.75             | 15.56                   | Smithfield .....              | 0.36           | 13.44             | 16.48             | 17.58                   |
| Laura .....                       | 0.55           | 11.25             | 17.19             | 18.20                   | Salisbury .....               | 0.88           | 14.79             | 17.71             | 18.63                   |
| Caltowie .....                    | 0.47           | 10.93             | 15.87             | 16.94                   | Adelaide .....                | 0.92           | 17.74             | 20.10             | 21.16                   |
| Jamestown .....                   | 0.65           | 11.99             | 16.75             | 17.95                   | Glen Osmond ..                | 0.83           | 21.10             | 24.83             | 26.19                   |
| Gladstone .....                   | 0.84           | 11.91             | 15.50             | 16.44                   | Magill .....                  | 1.22           | 19.99             | 24.30             | 25.77                   |
| Crystal Brook ...                 | 0.96           | 11.98             | 14.97             | 15.89                   | <b>MOUNT LOFTY RANGES.</b>    |                |                   |                   |                         |
| Georgetown .....                  | 0.86           | 13.67             | 17.47             | 18.53                   | Teatree Gully ...             | 0.93           | 18.71             | 26.21             | 27.70                   |
| Narridy .....                     | 1.14           | 13.40             | 15.15             | 15.99                   | Stirling West ...             | 1.57           | 37.75             | 44.98             | 47.04                   |
| Redhill .....                     | 0.48           | 12.84             | 15.78             | 17.02                   | Uraidla .....                 | 0.85           | 31.46             | 42.26             | 44.38                   |
| Spalding .....                    | 1.33           | 13.04             | 18.09             | 19.53                   | Clarendon .....               | 1.29           | 24.58             | 31.51             | 33.03                   |
| Gulnare .....                     | 0.83           | 14.24             | 17.62             | 18.92                   | Morphett Vale ..              | 0.69           | 17.44             | 21.72             | 22.78                   |
| Yacka .....                       | 0.73           | 13.33             | 14.41             | 15.40                   | Noarlunga .....               | 0.57           | 15.37             | 19.62             | 20.49                   |
| Koolunga .....                    | 0.37           | 11.25             | 14.57             | 15.61                   | Willunga .....                | 0.69           | 19.76             | 25.09             | 26.07                   |
| Snowtown.....                     | 0.43           | 11.68             | 14.94             | 15.78                   | Aldinga .....                 | 0.58           | 15.03             | 19.41             | 20.43                   |



## RAINFALL—continued.

| Station.                         | For Nov. 1930. | To end Nov. 1930. | Av'ge to end Nov. | Av'ge Annual Rain-fall. | Station.                             | For Nov. 1930. | To end Nov. 1930. | Av'ge to end Nov. | Av'ge Annual Rain fall. |
|----------------------------------|----------------|-------------------|-------------------|-------------------------|--------------------------------------|----------------|-------------------|-------------------|-------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                |                   |                   |                         | <b>WEST OF SPENCER'S GULF—contd.</b> |                |                   |                   |                         |
| Myponga .....                    | 0.76           | 24.60             | 27.90             | 29.62                   | Rudall .....                         | 1.64           | 13.76             | 11.57             | *12.14                  |
| Normanville .....                | 0.61           | 16.66             | 19.91             | 20.75                   | Cleve .....                          | 0.82           | 14.71             | 13.91             | 14.63                   |
| Yankalilla .....                 | 0.54           | 16.95             | 22.06             | 23.61                   | Cowell .....                         | 1.48           | 9.75              | 10.63             | 11.25                   |
| Mount Pleasant ..                | 0.82           | 21.96             | 26.21             | 27.38                   | Miltalie .....                       | 0.64           | 11.35             | 12.94             | 13.89                   |
| Birdwood .....                   | 1.26           | 23.21             | 28.03             | 29.41                   | Darke's Peak ..                      | 0.47           | 11.89             | 14.14             | 15.13                   |
| Gumeracha .....                  | 1.31           | 26.91             | 32.05             | 33.54                   | Kimba .....                          | 0.42           | 11.57             | 10.64             | *11.92                  |
| Millbrook Reservoir              | 0.98           | 25.56             | 33.72             | 36.18                   |                                      |                |                   |                   |                         |
| Tweedvale .....                  | 0.99           | 29.16             | 34.54             | 36.08                   |                                      |                |                   |                   |                         |
| Woodside .....                   | 0.78           | 24.20             | 31.05             | 32.47                   |                                      |                |                   |                   |                         |
| Ambleside .....                  | 1.18           | 27.62             | 33.62             | 35.09                   |                                      |                |                   |                   |                         |
| Nairne .....                     | 1.15           | 23.77             | 27.01             | 28.29                   |                                      |                |                   |                   |                         |
| Mount Barker ....                | 1.19           | 31.09             | 30.41             | 31.66                   |                                      |                |                   |                   |                         |
| Echunga .....                    | 1.21           | 24.69             | 31.99             | 33.35                   |                                      |                |                   |                   |                         |
| Macclesfield .....               | 1.07           | 22.21             | 29.39             | 30.72                   |                                      |                |                   |                   |                         |
| Meadows .....                    | 0.97           | 25.21             | 34.91             | 36.42                   |                                      |                |                   |                   |                         |
| Strathalbyn .....                | 0.72           | 14.43             | 18.54             | 19.43                   |                                      |                |                   |                   |                         |
| <b>MURRAY FLATS AND VALLEY.</b>  |                |                   |                   |                         | <b>YORKE PENINSULA.</b>              |                |                   |                   |                         |
| Meningie .....                   | 0.57           | 14.60             | 17.63             | 18.52                   | Walleroo .....                       | 0.63           | 10.72             | 13.35             | 13.99                   |
| Milang .....                     | 0.26           | 10.48             | 13.94             | 15.13                   | Kadina .....                         | 0.47           | 10.54             | 15.02             | 15.77                   |
| Langhorne's Creek                | 0.51           | 12.91             | 13.98             | 14.84                   | Moonta .....                         | 0.40           | 11.30             | 14.43             | 15.16                   |
| Wellington .....                 | 0.31           | 11.66             | 13.80             | 14.67                   | Paskeville .....                     | 0.34           | 10.35             | 14.94             | 15.67                   |
| Tailem Bend .....                | 0.30           | 13.06             | 13.66             | 14.77                   | Maitland .....                       | 0.74           | 15.05             | 19.23             | 20.03                   |
| Murray Bridge ...                | 0.27           | 9.82              | 12.95             | 13.84                   | Ardrossan .....                      | 0.37           | 11.19             | 13.43             | 14.02                   |
| Callington .....                 | 0.51           | 12.15             | 14.51             | 15.40                   | Port Victoria ..                     | 0.49           | 12.35             | 14.73             | 15.41                   |
| Mannum .....                     | 0.17           | 9.75              | 10.90             | 11.56                   | Curramulka ....                      | 0.51           | 14.62             | 17.20             | 17.98                   |
| Palmer .....                     | 0.41           | 13.29             | 14.68             | 15.59                   | Minlaton .....                       | 0.49           | 13.17             | 17.25             | 17.98                   |
| Sedan .....                      | 0.33           | 11.42             | 11.60             | 12.24                   | Port Vincent ...                     | 0.42           | 12.38             | 13.85             | 14.54                   |
| Swan Reach .....                 | 0.09           | 8.86              | 9.93              | 10.77                   | Brentwood .....                      | 0.37           | 11.92             | 14.90             | 15.67                   |
| Blanchetown .....                | 0.58           | 8.47              | 10.42             | 11.24                   | Stansbury .....                      | 0.39           | 12.23             | 16.28             | 16.95                   |
| Eudunda .....                    | 0.88           | 15.43             | 16.19             | 17.19                   | Warooka .....                        | 0.35           | 13.21             | 17.05             | 17.67                   |
| Sutherlands .....                | 0.48           | 10.33             | 9.40              | 10.87                   | Yorketown .....                      | 0.58           | 14.21             | 16.39             | 17.04                   |
| Morgan .....                     | 0.35           | 9.74              | 8.40              | 9.23                    | Edithburgh ....                      | 0.42           | 11.65             | 15.82             | 16.52                   |
| Waikerie .....                   | 0.47           | 10.98             | 8.83              | 9.71                    |                                      |                |                   |                   |                         |
| Overland Corner ..               | 0.30           | 8.77              | 9.68              | 10.58                   |                                      |                |                   |                   |                         |
| Loxton .....                     | 0.76           | 11.62             | 10.79             | 11.80                   |                                      |                |                   |                   |                         |
| Renmark .....                    | 0.57           | 8.73              | 9.73              | 10.60                   |                                      |                |                   |                   |                         |
| <b>WEST OF SPENCER'S GULF.</b>   |                |                   |                   |                         | <b>SOUTH AND SOUTH-EAST.</b>         |                |                   |                   |                         |
| Eucula .....                     | 0.17           | 13.49             | —                 | *                       | Cape Borda ....                      | 0.60           | 25.46             | 24.07             | 24.81                   |
| Nullarbor .....                  | 0.10           | —                 | *                 | —                       | Kingscote .....                      | 0.52           | 21.33             | 18.49             | 19.07                   |
| Fowler's Bay ....                | 0.51           | 7.70              | 11.47             | 11.85                   | Penneshaw .....                      | 0.21           | 12.55             | 17.63             | 18.75                   |
| Penong .....                     | 0.40           | 7.70              | 11.49             | 12.12                   | Victor Harbor ...                    | 0.83           | 17.25             | 20.57             | 21.32                   |
| Koonibba .....                   | 0.54           | 7.02              | 11.55             | *                       | Port Elliot .....                    | 0.77           | 14.09             | 18.96             | 20.05                   |
| Denial Bay .....                 | 0.60           | 7.48              | 11.16             | *11.56                  | Goolwa .....                         | 0.42           | 13.35             | 16.99             | 17.90                   |
| Ceduna .....                     | 0.69           | 7.51              | 9.40              | 9.92                    | Copeville .....                      | 0.32           | 8.75              | —                 | 11.58                   |
| Smoky Bay .....                  | 0.73           | 6.05              | 10.00             | 10.61                   | Meribah .....                        | 0.60           | 10.76             | 9.58              | *11.70                  |
| Wirrulla .....                   | 0.62           | 9.51              | —                 | *                       | Alawoona .....                       | 0.40           | 9.98              | 9.13              | *10.20                  |
| Streaky Bay .....                | 0.49           | 8.75              | 14.49             | 14.95                   | Mindarie .....                       | 0.36           | 10.14             | 11.02             | 12.46                   |
| Chandada .....                   | 0.26           | 10.02             | —                 | —                       | Sandalwood .....                     | 0.45           | 11.06             | 12.71             | 13.90                   |
| Minnipa .....                    | 0.46           | 10.37             | 13.35             | 14.68                   | Karoonda .....                       | 0.45           | 13.19             | 13.32             | 14.48                   |
| Kyanoutta .....                  | 0.60           | —                 | —                 | 13.68                   | Pinnaroo .....                       | 0.82           | 11.11             | 13.89             | 14.94                   |
| Talia .....                      | 0.34           | 9.58              | 14.12             | 15.27                   | Parilla .....                        | 0.65           | 11.89             | 13.12             | 14.15                   |
| Port Elliston ....               | 0.39           | 10.00             | 11.95             | 16.53                   | Lameroo .....                        | 0.68           | 13.51             | 15.25             | 16.33                   |
| Yeelanna .....                   | 0.38           | 10.78             | 15.38             | 16.12                   | Parrakie .....                       | 0.55           | 13.45             | 13.59             | 14.54                   |
| Cummins .....                    | 0.41           | 11.77             | 17.07             | 17.86                   | Geranium .....                       | 0.45           | 14.20             | 15.64             | 16.54                   |
| Port Lincoln .....               | 0.33           | 13.99             | 18.75             | 19.50                   | Peake .....                          | 0.20           | 13.58             | 15.32             | 16.41                   |
| Tumby .....                      | 0.63           | 10.45             | 13.30             | 14.22                   | Cooke's Plains ..                    | 0.35           | 11.89             | 14.58             | 15.46                   |
| Ungarra .....                    | 0.73           | 13.65             | 16.02             | 16.85                   | Coomandook ....                      | 0.32           | 13.22             | 16.42             | 17.45                   |
| Carrow .....                     | 0.40           | 7.99              | 12.57             | 13.47                   | Coonalpyn .....                      | 0.51           | 14.25             | 16.58             | 17.52                   |
| Arno Bay .....                   | 0.37           | 10.89             | 11.77             | 12.48                   | Tintinara .....                      | 0.75           | 14.05             | 17.70             | 18.78                   |
|                                  |                |                   |                   |                         | Keith .....                          | 0.63           | 15.85             | 16.92             | 17.96                   |
|                                  |                |                   |                   |                         | Bordertown ....                      | 1.26           | 16.87             | 18.29             | 19.39                   |
|                                  |                |                   |                   |                         | Wolseley .....                       | 1.35           | 18.38             | 17.43             | 18.36                   |
|                                  |                |                   |                   |                         | Frances .....                        | 1.10           | 19.91             | 18.76             | 19.96                   |
|                                  |                |                   |                   |                         | Naracoorte ....                      | 1.03           | 22.17             | 21.42             | 22.57                   |
|                                  |                |                   |                   |                         | Penola .....                         | 1.82           | 24.55             | 24.80             | 26.19                   |
|                                  |                |                   |                   |                         | Lucindale .....                      | 1.10           | 23.36             | 21.90             | 23.07                   |
|                                  |                |                   |                   |                         | Kingston .....                       | 0.83           | 21.79             | 23.21             | 24.40                   |
|                                  |                |                   |                   |                         | Robe .....                           | 1.10           | 26.26             | 23.52             | 24.60                   |
|                                  |                |                   |                   |                         | Beachport .....                      | 1.11           | 26.49             | 25.86             | 26.95                   |
|                                  |                |                   |                   |                         | Millicent .....                      | 1.60           | 28.32             | 28.51             | 29.70                   |
|                                  |                |                   |                   |                         | Kalangadoo ....                      | 1.97           | 29.66             | 30.83             | 32.30                   |
|                                  |                |                   |                   |                         | Mount Gambier ..                     | 1.88           | 22.06             | 29.08             | 30.82                   |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucula (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

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| Allandale East .....    | •               | 5                  | —    | Eurelia Women's .....           | •               | 3                  | —    |
| Alma .....              | •               | —                  | —    | Everard East .....              | 544             | —                  | —    |
| Amyton .....            | •               | —                  | —    | Farrell's Flat .....            | •               | 26                 | 30   |
| Angaston .....          | •               | —                  | —    | Finniss .....                   | •               | —                  | —    |
| Appila .....            | •               | —                  | —    | Gawler River .....              | •               | —                  | —    |
| Appila-Yarrowie .....   | •               | R                  | R    | Georgetown .....                | •               | 6                  | 3    |
| Arbuthnot .....         | 550             | —                  | —    | Geranium .....                  | •               | 27                 | 31   |
| Ashbourne .....         | •               | 3                  | —    | Gladstone .....                 | 545             | 5                  | 2    |
| Auburn .....            | •               | —                  | —    | Gladstone Women's .....         | •               | 12                 | 9    |
| Auburn Women's .....    | 546             | R                  | 30   | Glencoe .....                   | •               | 9                  | 18   |
| Balaklava .....         | •               | R                  | R    | Glossop .....                   | •               | —                  | —    |
| Balmain .....           | •               | —                  | —    | Goode .....                     | 553             | R                  | R    |
| Barmora .....           | •               | —                  | —    | Goode Women's .....             | •               | 8                  | 8    |
| Beetaloo Valley .....   | •               | R                  | R    | Greenock .....                  | •               | —                  | —    |
| Belalie North .....     | 543             | R                  | R    | Green Patch .....               | 553             | —                  | —    |
| Belalie Women's .....   | 543             | —                  | —    | Guinard .....                   | •               | —                  | —    |
| Berri .....             | •               | 3                  | 7    | Gumeracha .....                 | 561             | 8                  | —    |
| Big Swamp .....         | •               | —                  | —    | Halidon .....                   | 547             | —                  | —    |
| Blackheath .....        | 561             | 11                 | 8    | Hanson .....                    | •               | —                  | —    |
| Black Rock .....        | •               | R                  | R    | Hartley .....                   | •               | 31                 | 28   |
| Black Springs .....     | •               | 2                  | —    | Hawker .....                    | •               | 9                  | 6    |
| Blackwood .....         | •               | 8                  | 12   | Hookina .....                   | •               | —                  | —    |
| Block E .....           | 555             | —                  | —    | Hoyleton .....                  | •               | R                  | 19   |
| Blyth .....             | •               | 19                 | 16   | Inman Valley .....              | •               | 18                 | 15   |
| Booloroo Centre .....   | •               | 5                  | 2    | Ironbank .....                  | •               | —                  | —    |
| Boolgun .....           | 556             | 4                  | —    | Jamestown .....                 | 545             | R                  | R    |
| Boora Plains .....      | •               | 4                  | 8    | Kalangadoo Women's .....        | •               | 13                 | 10   |
| Borrika .....           | •               | —                  | —    | Kalangadoo .....                | •               | 40                 | 13   |
| Bowhill .....           | •               | 1                  | —    | Kalyan .....                    | •               | R                  | R    |
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| Buchanan .....          | •               | R                  | R    | Kapinnie .....                  | •               | —                  | —    |
| Bugle .....             | 556             | 9                  | 13   | Kapunda .....                   | •               | 12                 | 9    |
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| Butler .....            | •               | —                  | —    | Kelly .....                     | •               | —                  | —    |
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| Chandada .....          | •               | 19                 | —    | Kringin .....                   | •               | 8                  | 5    |
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| Clare .....             | •               | 2                  | 6    | Lameroo .....                   | •               | 6                  | 3    |
| Clarendon .....         | •               | 1                  | R    | Langhorne's Creek .....         | 561             | 3                  | —    |
| Cleve .....             | •               | 4                  | —    | Laura .....                     | •               | 6                  | 3    |
| Cobdogla .....          | •               | —                  | —    | Laura Bay .....                 | •               | 9                  | 13   |
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| Cungena .....           | •               | —                  | —    | Lyndoch .....                   | •               | 2                  | —    |
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| Mount Compass .....        | —               | 4                  | —    | Stockport .....              | —               | —                  | —    |
| Mount Gambier .....        | 536             | 12                 | 9    | Strathalbyn .....            | 563             | —                  | —    |
| Mount Hope .....           | 554             | 2                  | —    | Streaky Bay .....            | *               | 26                 | 23   |
| Mount Pleasant .....       | *               | —                  | —    | Tallem Bend .....            | *               | 11                 | 8    |
| Mount Remarkable .....     | *               | —                  | —    | Talla .....                  | *               | R                  | 30   |
| Mount Schank .....         | *               | —                  | —    | Tantanoola .....             | *               | 6                  | 3    |
| Mudamuckla .....           | †               | 13                 | 10   | Taplan .....                 | †               | R                  | R    |
| Mundalla .....             | †               | 4                  | —    | Taragoro .....               | 554             | R                  | R    |
| Murray Bridge .....        | —               | —                  | —    | Tarcowie .....               | —               | —                  | —    |
| Murraytown .....           | 546             | R                  | R    | Tarlee .....                 | 548             | —                  | —    |
| Mypolonga .....            | 558             | —                  | —    | Tatara .....                 | —               | —                  | —    |
| Myria .....                | —               | 3                  | —    | Thrington .....              | *               | —                  | —    |
| Nantawarra .....           | †               | 4                  | —    | Tintinara .....              | —               | —                  | —    |
| Naracoorte .....           | †               | 13                 | 10   | Truro .....                  | 548             | R                  | 12   |
| Narridy .....              | †               | R                  | R    | Tulkinera .....              | —               | 4                  | —    |
| Narrung .....              | —               | —                  | —    | Tweedvale .....              | 563             | 4                  | —    |
| Neleahby .....             | —               | —                  | —    | Two Wells .....              | *               | —                  | —    |
| Neleahby Women's .....     | 546             | R                  | 1    | Ungarra .....                | *               | 11                 | 8    |
| Netherton .....            | 559             | R                  | R    | Upper Wakefield .....        | *               | —                  | —    |
| New Residence .....        | *               | —                  | —    | Uraidla and Summertown ..... | *               | R                  | R    |
| North Booborowie .....     | *               | 1                  | —    | Veitch .....                 | *               | —                  | —    |
| Nunakompita .....          | —               | 4                  | —    | Virginia .....               | *               | —                  | —    |
| Nunkeri .....              | 559             | 3                  | —    | Walkerie .....               | 560             | 12                 | 9    |
| O'Loughlin .....           | —               | 8                  | 12   | Wallala .....                | †               | 10                 | 14   |
| Orroroo .....              | —               | —                  | —    | Wanbi .....                  | †               | 24                 | 28   |
| Overland Corner .....      | 559             | R                  | R    | Wandearah .....              | †               | R                  | —    |
| Owen .....                 | 547             | 5                  | 2    | Warcoole .....               | †               | R                  | R    |
| Palable .....              | —               | —                  | —    | Warramboo .....              | 554             | 2                  | —    |
| Parilla .....              | †               | —                  | R    | Wasleys .....                | 549             | 11                 | 8    |
| Parilla Women's .....      | —               | 17                 | —    | Wasleys Women's .....        | †               | 4                  | —    |
| Parilla Well .....         | *               | 8                  | 5    | Watervale .....              | 549             | —                  | —    |
| Parilla Well Women's ..... | *               | R                  | 27   | Wauratoo .....               | —               | 2                  | —    |
| Parrakie .....             | †               | —                  | —    | Weavers .....                | 553             | 8                  | 12   |
| Parrakie Women's .....     | †               | 16                 | 27   | Wepowie .....                | 542             | 1                  | —    |
| Paruna .....               | 559             | 5                  | R    | White's River .....          | *               | 9                  | 13   |
| Pastokville .....          | 552             | R                  | R    | Whyte-Yarcoole .....         | —               | —                  | —    |
| Pata .....                 | —               | 5                  | 2    | Wilkawatt Women's .....      | 560             | 16                 | —    |
| Penneshaw .....            | *               | —                  | —    | Williamstown Women's .....   | 550             | 3                  | 7    |
| Penola .....               | †               | 6                  | 3    | Williamstown .....           | *               | —                  | —    |
| Penwortham .....           | 548             | 4                  | —    | Willowie .....               | *               | R                  | R    |
| Petersville .....          | 552             | 2                  | —    | Wilmington .....             | †               | 16                 | 20   |
| Petina .....               | —               | 27                 | 24   | Windsor .....                | †               | —                  | —    |
| Pinbong .....              | †               | 6                  | —    | Wirrabara .....              | †               | —                  | —    |
| Pinakwillinie .....        | —               | —                  | —    | Wirrilla .....               | †               | R                  | R    |
| Pinaroo .....              | 559             | —                  | —    | Wirrilla Women's .....       | †               | 4                  | 8    |
| Pinaroo Women's .....      | 559             | 5                  | 2    | Wirrulla .....               | †               | R                  | R    |
| Poochera .....             | —               | —                  | —    | Wolsley .....                | —               | 15                 | 12   |
| Port Elliot .....          | †               | R                  | R    | Wudinna .....                | 555             | —                  | —    |
| Pygery .....               | 554             | —                  | 3    | Wynarka .....                | *               | —                  | —    |
| Quorn .....                | —               | —                  | —    | Yacka .....                  | *               | —                  | —    |
| Ramoo .....                | †               | 1                  | —    | Yadnarie .....               | *               | 2                  | —    |
| Rapid Bay .....            | †               | 11                 | 8    | Yallunda Flat .....          | —               | —                  | —    |
| Redhill .....              | 546             | —                  | —    | Yandiah .....                | 546             | R                  | R    |
| Rendelsham .....           | †               | 2                  | —    | Yaninee .....                | *               | —                  | —    |
| Renmark .....              | 560             | —                  | —    | Yantanable .....             | *               | —                  | —    |
| Rhyale .....               | —               | —                  | —    | Yeeelanna .....              | *               | 8                  | —    |
| Richman's Creek .....      | —               | 4                  | —    | Yorktown-Melville .....      | 552             | —                  | —    |
| Riverton .....             | 548             | R                  | R    | Younghusband .....           | —               | —                  | —    |
| Riverton Women's .....     | *               | —                  | —    | Yurgo .....                  | 560             | —                  | —    |

\* No report received during the month of November.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

#### LUCERNE CULTIVATION.

##### THE CULTIVATION OF LUCERNE.

The following paper was read by Mr. W. H. Downes (District Dairy Instructor) at a meeting of the Mount Gambier Branch held on August 8th:—Lucerne is perhaps one of the eldest and most widely cultivated fodder crops known to mankind, being recorded in ancient history as far back as 490 B.C. At the present time it is extensively grown in most parts of the world, but principally throughout the United States, certain temperate portions of Canada, South America, Mexico, along the Mediterranean shores of Northern Africa, South Africa, Southern Europe, practically all parts of Asia, and is one of the leading fodder crops in the Commonwealth.

##### SUITABILITY TO AUSTRALIAN CONDITIONS.

In Australia the acreage under lucerne is steadily increasing each year, and it has now been proved in certain districts previously deemed unsuitable, and where for that reason it had never been given a trial, that lucerne will do remarkably well. This shows that it is a fairly hardy plant, capable of adapting itself to a wide range of conditions, in regard to soil and climate.

##### ITS VALUE AS A FODDER CROP.

Lucerne has been very correctly designated the "King of Fodders," for, judging by its ever-increasing popularity as a stock food, the name appears to be well merited. There are a number of reasons why lucerne should be even more extensively cultivated, always providing the conditions are suitable, and it would pay many farmers and stock-owners handsomely to give it a trial by planting a portion of their property with this wonderful fodder. Lucerne is of special value on account of the fact that it grows most vigorously during summer, at a time when green feed is rarely plentiful. A few acres of lucerne may be the means of saving livestock, for frequently working horses have been restored to health, ewes pulled through a bad spell, or cows kept in profit during a dry season, when lucerne has been available. It has also proved invaluable as a means of providing reserves of fodder, in the form of hay or silage, to carry farmers over a lean period, by systematically putting aside one or two cuts out of the four, five, or possibly six cuts obtained in a plentiful season.

##### PRINCIPAL RECOMMENDATIONS.

(1) It is a profitable crop, and should considerably enhance the land value and carrying capacity of holdings. (2) It excels most other crops, generally speaking, in yield per acre, feeding value, and its ability as a drought-resister and soil enricher are well known. (3) It can be utilised in various ways, making excellent hay, silage, or in its green state either by cutting or grazing. (4) The continual cutting of the crop tends to minimise weeds. (5) In comparison to its yield, the costs associated with lucerne cultivation, harvesting, and machinery required, are not excessive when once established. (6) It is eminently suitable for feeding to all classes of farm stock, viz., horses, cattle, sheep, pigs, and poultry. (7) The risks of fire, ever present in the case of ripe cereal crops, or hay in stacks, are considerably lessened when lucerne is the principal forage crop grown on the farm. (8) Being a perennial, it should not require replanting for a number of years, particularly if the grower has been careful in his methods of treating and harvesting the crop.



## FEEDING VALUE OF LUCERNE.

If the crop has been harvested correctly, the entire plants are utilised and assimilated by stock, so that, generally speaking, there should be practically no waste. The proportion of digestible protein (organic nitrogenous compounds) to carbohydrates (starch) is fairly high, in comparison to other foods, being one to six. This constitutes what is termed a narrow ration, and when lucerne is mixed with fodders of wider feeding ratio, or, in other words, lower in protein content, the ration is considerably enriched, thereby tending to make animals more healthy, productive, and being especially suited to the feeding of young or growing stock. It is a notable fact that milking cows have been known to increase their yield by more than half, when placed on a diet consisting mainly of lucerne, their coats soon assuming that sleek, glossy appearance which denotes good health.

## VARIETIES OF LUCERNE.

Many varieties have been tried by experiment in this country in order to form some conclusion regarding the most suitable types. The list includes Tamworth Broad Leaf, Hunter River, French Provence, Bathurst No. 6, New Zealand Marlborough, Baltic, Siberian, Hansen, Cossack, Semipalatinsk, Grimm's, Montana, Kansas, Peruvian or Hairy Lucerne, Algerian, Arabian, and Turkestan. Tamworth Broad Leaf is a well-known variety which suits the warmer climates and coastal regions where there is a good rainfall, and produces an abundance of fodder. Hunter River and Bathurst No. 6 are both strains of the imported French Provence type, which have been acclimatised in New South Wales, and are giving excellent results. Of the Russian varieties imported, the majority are cold climate Alfalfas, and though good frost resisters, with the exception of Cossack, are poor in leaf and stem. Grimm's, an importation, appears to do particularly well on the tablelands, while Semipalatinsk, which has a spreading habit of growth, is extensively grown in the dry interior of America. China appears to be a promising variety, which, besides stooling well, produces a large amount of leaf. By the foregoing it will be noticed that there is quite a good assortment of varieties from which to make a selection, and a type to suit most localities, though differing widely in their particular conditions.

## CLIMATIC CONDITIONS.

Until recently it was considered that lucerne would only give profitable results on rich alluvial flats, in moderate to warm climates, with moist conditions, either natural or artificially provided, and without doubt these are the ideal conditions or factors contributing to a good stand. To-day, however, there is no question that even in climates formerly regarded as too cold or too dry, good crops can be and are secured, which will yield two or three cuts a season, before turning over to grazing for the remainder of the year. While types which have proved so successful in our recognised lucerne districts are not constitutionally adapted to the colder parts of the Commonwealth, very good results have been obtained in Northern and Midland Tasmania, Gippsland, Western District, and other cooler parts of Victoria, Tamworth, Moree, Griffith, Cowra, and Denman, in New South Wales; in South Australia, chiefly on the Murray Flats; and in Queensland and Western Australia.

## SOIL CONDITIONS AND RAINFALL.

Lucerne, though perennial and so prolific in habit, requires for its successful cultivation certain definite soil conditions, and although it will thrive in a host of soils, and is amenable to wider variations in rainfall than most crops, it needs a deep, permeable, well-drained soil and subsoil in order to establish and extend its efficient root system. Lucerne in fields where damp patches occur will develop wet feet, then it soon dies out and becomes replaced by weeds. It has a great partiality to lime, and granted that it is present in the soil in sufficient quantity, will materially assist lucerne in supplying nitrogen compounds to soils definitely lacking in that respect. This element is extracted from the atmosphere by a complex process, embodying the root nodules and certain soil bacteria, which latter operates best at depths ranging from 12in. to 24in., converting free nitrogen into available plant food. Without making several small experiments, it would be impossible for any farmer to know that lucerne would not grow on his farm or to conclude that it will not suit his particular conditions, when in all probability with only one trial failure may be due to lime deficiency, or poor soil drainage. He should, however, make tests with a number of varieties on different portions of the farm, in order to decide the deepest and best drained soil for the purpose. Lucerne, of course, is dependent on moisture, without which heavy or even good crops are out of the question. A rainfall of 20in. and upwards is desirable, but in good soils where the fall is lower it can be supplemented by irrigation.



Before condemning a district as unsuitable for lucerne culture, farmers should answer the question, "What pasture fodder of a permanent nature will do better." As lucerne makes its maximum growth during the late spring and throughout the summer, frequent falls of rain at that period are distinctly beneficial. This does not imply, however, that in localities where winter rains predominate, lucerne-growing will be unprofitable. The most ideal soils for lucerne are of the rich, alluvial loam variety, found along river banks. The best are of a deep, free nature, abounding in lime and potash, with free moisture at a depth of 15ft. to 30ft. Conditions approaching these exist in parts of New South Wales, chiefly the Hunter River, Tamworth, and Moree districts, where many growers have made comfortable livings on areas not exceeding 30 acres.

#### SOIL PREPARATION.

A good method of preparing soil for lucerne is to grow another leguminous crop, prior to seeding, such as Berseem or Sweet Clover, which may be either grazed or turned under. This has the effect of sweetening the soil, and freeing the land from objectionable weeds, besides which providing humus and available nitrogen for giving the young plants a good start. A reserve of moisture in the soil can then be created by adopting a thorough system of fallowing, which will give the previous cleaning crop sufficient time to decompose. At this stage, while fallowing is in progress, and effort should be made to grade the land and level off the hollows, if required, particularly if the lucerne is to be irrigated. If hollows are allowed to remain, they may prove a harbor for stagnant water, with the result that plants in those patches will become waterlogged, and eventually die out. Where stiff subsoils exist, it may be necessary to use a subsoil plough, for although lucerne is provided with deep penetrating roots, a better stand will usually be secured by this practice. If fallowing has been satisfactorily carried out, however, for at least six months, deeper ploughing than 3in. to 4in. just before sowing is not generally recommended. Working deeper merely buries the sweetened surface soil, destroys the firm condition of the seed-bed, and may promote weed growth.

#### LIMING.

If lime is to be applied, it should be placed on the land in heaps two or three months before sowing commences. After it has thoroughly airslaked, it should first be partly spread with a shovel, and afterwards evenly distributed by means of the harrow or cultivator during fallowing. Lime should only be worked into the surface, and never ploughed in.

#### THE SEED BED.

The actual preparation of the soil for sowing must be directed towards obtaining a firm seed bed. The most effective treatment for securing this result is by thoroughly harrowing and rolling the land. Except in soils of a light sandy nature, a light harrowing might follow rolling with good effect. If soils are naturally heavy, and inclined to set, it is advisable to break the smooth, rolled surface, in order to avoid excessive consolidation after the first rain.

#### TIME FOR SOWING LUCERNE.

Lucerne may be sown during spring or autumn, this being determined more or less by local climate conditions in relation to climate and weed growth. Generally speaking, autumn sowing is most favored, providing winter conditions are not so severe as to prevent the seedlings from becoming well established. Autumn planting will enable the young plants to thrive without much interference from weeds, and they are therefore better equipped to withstand heat or dry winds the following summer. Spring sown crops, on the other hand, usually have to contend with more vigorous weed growth, besides which they are hardly so well developed before the summer arrives, and in consequence are likely to suffer. In some districts the prevalence of strong winds and dry conditions during spring make satisfactory germination almost impossible, thereby necessitating autumn sowing. Weeds can usually be checked more easily by the summer fallowing preceding autumn sowing, when weeds will be turned up and their roots exposed, before they have an opportunity to seed.

#### QUANTITY OF SEED.

In good lucerne localities the heavier the seeding, within reason, the better; heavy sowing tends to produce crowded plants, thus encouraging the growth of fine stems. Under these conditions 12lb. to 16lb. of seed would not be considered excessive. In drier districts, lacking the advantages of irrigation, lighter sowing of from 4lb. to 5lb., and a space of 9in. to 12in. between plants, will be found advisable, as it permits better standing, and allows for frequent cultivation.



### GOOD QUALITY SEED A NECESSITY.

The quantity of seed required also depends largely on the quality, and on account of the longevity of the crop, it is essential that only the best graded seed is procured. Strangers and other impurities frequently occur in lucerne seed, and include such weed seeds as Fat hen, Wire weed, Docks, Mallows, Ox tongue, Hexam scent, Pigeon grass, Pepper weed, Stink weed, and Dodder. It is quite possible to secure seed over 99 per cent. pure, but should it exceed 5 per cent. impurity, it would be only regarded as second grade, this class also including grains of irregular and shrunken or broken condition, totally unsuitable for successful lucerne growing. Hard seed may cause protracted or uneven germination, but in United States of America a considerable quantity of this sort of seed is processed, by passing through a scarifying machine, whereby the seed covering is scratched and thinned, without detriment to the seed itself. Before purchasing large quantities of this expensive seed, the grower would be well advised to secure several samples. He should first satisfy himself as to the amount of impurity present, and then carry out a few germinating tests, by placing 100 seeds of each lot on separate plates, between a folded sheet of moist blotter. These should be placed in a room where the temperature remains at about 80 degrees, and the paper kept continually moist. If at the end of three days 60 per cent. of the seed has germinated, he can rest assured that it is a good sample.

### METHOD OF SOWING.

Seed may be either drilled or broadcasted, using the grass-seed attachment for the former or the Cahoon, Tiger, or Fiddle for broadcast. If no grass-seed attachment is available, the required amount of seed can be sown by mixing it with a definite quantity of super, and setting the drill to distribute that quantity per acre. A broadcasting effect can be obtained by allowing the tubes to hang free of the hoes, and trailing a strip of netting behind the drill to cover the seed. Preference is usually given to the drilled-in method, on account of securing a more uniform germination, seed economy, and the fact that it facilitates thorough cultivation once the crop is established. Deep seeding usually is not conducive to good results, and care should be exercised when drilling to avoid planting too deeply. The depth to plant should never exceed 1½ in.; usually ½ in. to 1 in. is ample, and rolling after sowing is essential to compact the soil round the seed in order to secure a good stand.

### SUBSEQUENT TREATMENT.

The main object of treatment immediately after sowing, when the young plants are up, is to keep weeds in check, but although light harrowing may be an advantage, it is generally risky at this stage. Probably the wisest method to adopt in retarding early weed growth is to mow the crop a few times, before it commences to flower, at intervals of about three to four weeks. In this way the lucerne plants commence to stool, develop their roots, &c., before weeds have the chance to run to seed. It is advisable not to mow too close to the ground with the earlier cuts, but always leave a few leaves. After the second or third cut, particularly if the ground has set hard, the harrows may be used. The first harrowing should be lightly done, to avoid loosening the immature plants from their position, and only the surface or crust stirred, to admit air, without unduly exposing the roots. After the plants are established, however, and have secured a firm hold, there is little danger of disturbing them even with heavy cultivation or harrowing, except in the case of extremely light-conditioned soils.

### IRRIGATION.

Lucerne is a greedy plant where moisture is concerned, and although good yields are obtained in districts having a rainfall of approximately 20 in., the returns can be greatly augmented by irrigation. Water for irrigation purposes should not be too hard, i.e., the alkali content should be low. It is advisable to allow newly-sown crops to stand for five or six weeks before watering. Irrigate a week before and a week after each cut, if required, but avoid watering when there is practically no foliage to protect the ground. Cultivate again as soon as the land is ready and not too sticky. The amount of water to apply will vary from 1 in. to 4 in., according to the nature of the soil and rainfall. The two best ways of irrigating are the sprinkler method and by flooding, and although the former is a decided improvement on most methods, the plant is fairly costly. Flooding is most commonly practised, and gives very satisfactory results.

### TOP-DRESSING.

Some growers entertain the mistaken idea that, other than the ordinary cultivation given to lucerne, it requires no further treatment. Their argument is possibly due to a limited knowledge of the plant and its habit of growth, and they reason that if lucerne



enriches the soil in nitrogen, and possesses a healthy root system, why should the application of manure be necessary. To be profitable, it requires as much attention as any ordinary crop, particularly on account of its almost permanent nature, and the farmer who desires to prolong its life, and secure the maximum return, will neglect nothing that will tend to invigorate and sustain healthy growth. Experiments conducted in New South Wales prove conclusively that the application of super invariably increases yields up to 200 per cent. over untreated plots in many instances, and in addition to an abundance of healthy green leafage, a better quality lucerne generally is obtained. The most outstanding advantages accruing from the systematic top-dressing of lucerne with super may be summarised as follows:—1. The useful life of the crop may be extended, and unthrifty stands restored to productivity. 2. The yield of fodder is greatly increased. 3. The fodder is generally of much superior quality, and a healthy dark-green growth promoted throughout the growing season.

#### CUTTING LUCERNE IN THE GREEN STAGE.

Lucerne for green fodder should be cut just before it is ready for haymaking, before the flowering stage has progressed too far. It is best, if possible, to wait for a dry day to facilitate mowing and avoid sweating, but if mowing can be successfully carried out, the green stuff may be spread more thinly. This is important when feeding to stock in large quantities, particularly in the case of milch cows, when it is advisable to mow an hour or two prior to using to allow it to wilt slightly. This practice obviates the danger of hoven or bloating, and also, in the case of milking cows, lessens the likelihood of a taint, which commonly occurs with freshly-mown lucerne. For milk production, lucerne in its green state is probably unsurpassed as a fodder, allowing, of course, for the slight objection on account of its tainting properties. Extremely heavy yields of green fodder have been secured, especially under irrigation, and quantities between 5 tons and 6 tons of hay per acre are not exceptional. One distinct advantage it has is that the entire plant is edible. If long enough when cut, it will usually rake up fairly clean.

#### HARVESTING FOR HAY.

This is an operation calling for good judgment and attention to detail. Serious losses are easily involved at this stage due to the shedding of leaf through cutting at the wrong time, or by careless or rough handling. A poor quality hay and light yield is the natural result. Usually a certain amount of flowering is permitted before commencing mowing operations. Generally speaking, after the first few flowers are cut, approximately one-third, cutting should commence, but this will, of course, depend on local conditions, such as the area to be harvested, labor available, and the weather. If cut at the stage indicated, the best quality hay is obtained, and the succeeding growth will be more vigorous. Should weather conditions be hot and dry, the rake should follow the mower closely and cocking be done almost immediately afterwards. For milder conditions allow the crop to remain in windrows several hours. Weather conditions also control the length of time the lucerne remains in the field in cocks. When it is warm and dry, two days should be sufficient, but when mild, cloudy or misty weather is encountered, allow from four to seven days. If remaining for the longer period, it will be necessary to turn the cocks by fork to avoid mould development, which would otherwise seriously injure the quality of hay. The drying out of hay depends more on the condition of the stalks than the leaves, as the former naturally take longer. It requires some experience for the grower to judge the correct time to commence carting in and stacking operations. When the hay is handled it should feel light, soft, and crisp, without being over-brittle. The chief dangers to avoid are:—1. Loss of leaf due to over-drying. 2. Firing in stack through moisture and overheating. 3. Mouldy hay due to being damp when carted in. After a little experience the farmer should be able to avoid these troubles and be able to cure a fair sample of hay.

#### PRESSING IN THE PADDOCK.

Many growers who possess large areas have adopted the method of baling or pressing in the field to save double handling. This practice, to be successful, will depend largely on weather conditions prevailing at harvesting time, and it is essential that they are ideal for the purpose. A push rake may be utilised to bring the hay to the stationary press, and if necessary, cocking can be dispensed with. If it can be done, however, the quality of the hay is greatly improved, curing better, and the plants retain more leaf when properly cocked. The press may be moved from time to time to the centre of a fresh area, thus avoiding long trips with the push rake. Two wires are placed on each bale, which may measure 3ft. 4in. x 1ft. 6in. x 1ft. 4in. Bales when pressed weigh approximately 84lb., and are, therefore, easily handled.



## ADVANTAGES OF PRESSING IN PADDOCK.

1. Simplicity of handling and saving of labor. 2. In only being handled once there is less loss of leaf. 3. The good color in hay is retained by immediately baling. 4. Less space is required for stacking the compressed hay. 5. When carting out a bigger load is more easily put on without waste. 6. If bales become wet, the moisture does not penetrate deeply, and they are easily turned for drying purposes. Quite possibly the grower with a small area under lucerne would hardly be in a position to press it into bales. He would, therefore, find it cheaper and more convenient to stack it, but for preference this should be done under cover if possible.

## NUTRITIVE VALUE OF LUCERNE HAY.

Of all the legume hays, lucerne takes the foremost position, on account of its higher content of crude and digestible protein and lime. American experiments conducted during 1927 showed that Alfalfa (Lucerne) produced an average of 2.79 tons, Clover 1.75 tons, and Timothy Grass hay 1.28 tons per acre. The total yields of crude and digestible protein were:—Lucerne 591lbs., Clover 266lbs., and Timothy Hay 86lbs. per acre. Lime contents were:—Lucerne 108.8lbs., Clover 56lbs., Timothy 7.15lbs. In Lucerne, the total digestible nutrients were 2,879lbs., Clover 7,781lbs., and Timothy 1,387lbs. per acre. The American experiments in this connection go even further, and the estimated cost of 100lbs. of crude and digestible protein is as follows:—Alfalfa, 12.02 dollars per ton=5.66 dollars per 100lbs. protein; Clover, 11.91 dollars per ton=7.83 dollars per 100lbs. protein; Timothy, 11.31 dollars per ton=18.85 dollars per 100lbs. protein. From a comparison of the foregoing figures it would take 3.5 tons of Timothy hay, at a cost of 39.58 dollars, to produce the protein equivalent of 1 ton of Alfalfa hay, costing only 11 dollars. Even when compared with high protein concentrates such as linseed or cottonseed meal, lucerne compares more than favorably in cost per 100lbs. protein at average market rates. If dairymen in particular, and stockowners generally, would produce and feed more protein in the form of legume hays, their feed bills would be considerably reduced, and they would have an admirable basis for securing an economic, properly-balanced ration. In addition to supplying more milk-making nutrients at a much lower cost, legumes are far superior to non-legumes in palatability. They are also superior in the lime content and quality of the protein. The essential amino acids present in legume hay also supplement to advantage that particular deficiency in cereal hay or silage. All clovers make good hay when cut at the proper stage, and well cured, but most dairymen consider that it is hardly equal to lucerne hay, though a close second.

## FEEDING TRIALS.

Experimental feeding trials comparing legume hays with non-legumes for milk production have invariably shown that the former produce more milk at lower feed cost. Not only are legumes efficient in this way, but they are almost indispensable for the correct feeding of dairy heifers. Their palatability and high content of necessary bone and flesh-forming nutrients commend them for inclusion in the ration of growing animals.

## LUCERNE SILAGE.

Although lucerne by itself is not generally recommended for ensilage, there are quite a number of farmers on the Murray irrigated flats who have utilised it in this way with success. It needs more care and judgment to decide just when the crop is fit, and a great danger of spoiling the entire crop through scouring and fire. When mixed with cereals, maize, or sorghum, it forms a rich, sweet, succulent fodder which is probably unequalled for feeding to milk cows. The crop should be cut a little earlier than when intended for hay and immediately carted into the silo. In this way practically the whole green weight of the fodder is retained. As a rule, when cured on its own, it makes a heavy dark silage which, however, is usually greatly appreciated by stock.

## LOCAL RESULTS WITH LUCERNE.

We have a very fine example of lucerne under irrigation at Kybybolite Experimental Farm. The area comprises two sections of 1.62 acres and 3.15 acres respectively, the former being sown down in 1923 and the latter one year later. The usual practice is to cut the majority green for cattle feed, the last cut, however, being utilised for hay. Approximately six waterings are given during the drier months of the year. During the season 1926-1927 28.36 acre inches were applied in this way. The smaller section was top-dressed with 15 tons of farmyard manure per acre immediately after the hay cut in November, then dressed with 2cwt. of 45 per cent. superphosphate the following January.



*Harvest Results of Lucerne.*

|                               | Tons. Cwts. Lbs. |    |     |                       |
|-------------------------------|------------------|----|-----|-----------------------|
| 1st season . . . . .          | 8                | 19 | 87  | green weight per acre |
| 2nd season . . . . .          | 22               | 2  | 32  | green weight per acre |
| 3rd season . . . . .          | 22               | 0  | 109 | green weight per acre |
| 4th season (5cwts.) . . . . . | 18               | 1  | 73  | green weight per acre |

The second section is conducted purely on experimental lines to discover and compare the effects of different phosphatic fertilisers, and for this purpose is divided into six separate plots. Results so far favor plots 1 and 2, the former dressed with 1 ton lime in 1924 and 6cwts. 45 per cent. super 1925-1927, the latter with 6cwts. 45 per cent. super during 1925, 1926, and 1927. The remaining four plots dressed with less soluble forms of phosphates neither yield nor look as well as the first two plots. Mr. C. T. Major, of Glenburnie, has a total area of 12 acres under lucerne which is not irrigated. This is sown on light sandy soil, which if cultivated in windy weather, drifts badly. Mr. Major contends that the planting of lucerne on this portion has, to a large extent, prevented serious drifting. He has now taken off 64 cuts—an average of four cuts annually for 16 years off one sowing. During August the crop is cultivated twice with a spring-tooth, then dressed with 1cwt. of super, and finally harrowed. The first cut, usually ready before Christmas, is utilised for hay, and has frequently attained a height of 3ft. with good stooling. Unfortunately, no record has been kept in connection with yields. Usually a bright warm day is selected if possible for harvesting. The crop is cut, raked, and cocked all in one day. Following the hay-cut there are usually three more for green feed at approximately one month intervals. Another local grower is Mr. R. R. Mackay (The Springs), who has a large portion of his farm sown down with lucerne. This is the principal fodder used on the farm, chiefly for dairy cows, both as hay and in the green state. Some of the paddocks (none of which are irrigated) have been established for the past 20 years, and some very fine crops have been harvested. Mr. S. J. Bonney, of Glencoe, is another who has had success with the cultivation of lucerne. In addition, there are several more small plots to be noticed around the district that appear to be giving very favorable results. It would appear from the foregoing that lucerne should suit this district very well. Provided proper care in soil preparation is observed, and a good sample of seed secured, it should not prove a difficult crop to establish. Although the lucerne flea is a rather troublesome pest in this district, the period of its destructiveness is usually fairly limited, and during some years it is hardly seen at all. In normal seasons allowing for its depredations, the grower should secure at least four, possibly five, cuts per annum off an established crop in the South-East.

**UPPER-NORTH DISTRICT.****(PETERBOROUGH AND NORTHWARD.)**

MORCHARD (Average annual rainfall, 13.58in.).

August 15th.—Present: Seven members.

**FARMING COSTS.**—Mr. B. McCallum read the following paper:—"Any person contemplating farming must carefully consider land values, and it must be admitted that the prices paid in the past decade for agricultural land have been above productive values. In this district—mostly outside of Goyder's line of rainfall—farms have been sold at £7 per acre. This outlay, on present prices of farm produce, is not likely to return interest after working expenses are accounted for. The same applies in good rainfall districts. The large sum of money required to purchase land on which to commence farming must make farming expensive in the settled districts. Take a 700-acre holding at £10 an acre—and one could not purchase inside of Goyder's line a moderately improved farm for less than that figure—interest alone on that holding would be £455 at 6½ per cent. This means that the holding must yield big averages to make farming pay. The question is often asked, 'what is the cost to the farmer to produce a bushel of wheat?' The speaker then quoted figures of costs of production from a paper, in the May issue of the *Journal of Agriculture*, by a member of the Alma Branch. "Such costs to the man on the land, owing to the fact that he cannot pass them on, and the expenses which are continually being forced upon him by the ever increasing cost of production, is one of the biggest of the many problems which confront the primary producer. Nearly all other classes of the community receive Government protection in some way or other, and can also pass their additional expenses on by adding to the price of their manufactured articles, and through organised concerns this is easily done. There are only two ways by which the farmer can expect to get any relief—



first, by securing a greater yield per acre for the same cost of working per acre; and secondly, to eliminate waste and turn it to profit. In dealing with the costs of working per acre one must have a thorough knowledge of the most economic method of tilling the farm in his own particular locality. Increased yields may be brought about by improved varieties of wheat, selected varieties for certain classes of land, and taking advantage of the late, mid, and early wheats, according to time of seeding. To eliminate waste which takes place through the purchase of unsuitable machinery on many farms, implements that are dear to purchase have been used but a few seasons and then put aside, and something else purchased to take their place. Then light implements should not be expected to do a heavy implement's work. Each implement should receive proper adjustment and be protected from the weather when not in use. Waste also takes place on many farms through overfeeding farm stock. When plenty of feed is available a suitable ration should always be supplied, and when the opportunity comes for storing fodder, it should be taken advantage of, especially in the dry areas." (Secretary, Mr. A. McCallum.)

#### WEPOWIE.

Meeting held August 19th at the residence of Mr. Gregurke. Present: 11 members and 85 visitors. Mr. E. L. Orchard (District Agricultural Instructor) gave an address, "The History of Bread-making." The meeting then took the form of a social evening. (Secretary, Mr. E. Rooke.)

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

BELALIE NORTH (Average annual rainfall, 17.95in.).

August 4th.—Present: Nine members.

FARM MANAGEMENT.—Mr. A. Bray read the following paper:—"To manage a farm in a business-like manner, the farmer should adopt as his motto 'A place for everything and everything in its place,' and he will be saved endless time and worry. First, have the homestead situated as centrally as possible, so that time occupied in going to and returning from work will be reduced to a minimum. Have a blacksmith's shop, and equip it with the necessary tools and a good assortment of nails, bolts, screws, washers, etc. Keep a few well-seasoned posts on hand, also a good wire strainer for effecting repairs which become necessary from time to time. Convenient gates that are easily opened and large openings in fences through which one can take the widest implement without dismantling will prove the means of saving much time. Now that the motor car is so universally used, the farm will not be complete unless a motor ramp is provided. Plenty of shed room for implements will prove a good investment. After a machine has finished its work for the season, take a note of any parts that are worn out or broken, and order them just prior to the next occasion on which the machine will be needed. Provide the horses with warm and comfortable quarters, and place the chaff shed in such a position that it will facilitate feeding. If a tractor is used, see that it is overhauled before the busy seasons commence. On most farms a flock of sheep is a necessity. Sheep assist in the cultivation of the land, and supply the homestead with meat. Fowls, cows, and pigs are also worthy of consideration. A diary in which is recorded the history of the various paddocks, livestock, &c., will prove most valuable, and in later years made interesting reading. Pay as many accounts as possible by cheque. The heels are of considerable assistance in compiling income tax returns." Discussing the paper, Mr. Carmichael thought farmers should take more care in keeping a set of books of the various farm transactions. For the moving of implements from one part of the farm to another Mr. Bray suggested a race. (Secretary, Mr. E. Carmichael, Jamestown.)

BELALIE WOMEN'S (Average annual rainfall, 17.95in.).

July 8th.—Present: 23 members.

THE DEVELOPMENT OF INFANT TRAINING TO THE PRESENT TIME.—Mrs. Moy read the following paper:—"Education, in the sense of preparation for life, must be as old as mankind, because the continuity of the human race would have been impossible if father and mother had not taught son and daughter how to provide the necessities of life. Each individual family in the earliest days received its education at home, but soon after the discovery of the art of writing, with its essential complement, the art of reading, the advantage of collective instruction by specially qualified persons must have soon become apparent. Schools being co-eval with civilisation, it seems rather remarkable that the idea of sending infants to school should be so very modern. Still, when we realise how precious the little one is to its mother, we can imagine how grudgingly



she hands over her care. Mothers must be convinced that the teacher is a competent, lovable, and understanding person, who will deal wisely and gently with her child. In the year 1769 a man who took great interest in infants was discovered in the name of Frederick Oberlin; he also had met a lady named Sarah Banzel, whom he appointed as a conductress of early youth. So much did this lady do for the betterment of Infant Schools that "The Medal of Honor" was conferred on her by the French people. The little ones were assembled in airy, spacious rooms and watched closely. Amusement played a great part in the scheme. The children were taken for long walks by the teachers and made to find flowers which had been described to them. About 1800, a managing director of a spinning mill began a series of industrial and social development. In order to make the cotton industry pay, children were required to go to work at the ages of 6, 7, and 8 years respectively. The famous Frederick Oberlin, who had done so much in reforming children's life, advised parents to keep their children at school until they were 10 years old. There they were taught reading and writing from 5 years to 10 years. About this time Oberlin had a large playground and building erected. The children were admitted at the age of 3 years, and were constantly superintended to prevent the infants acquiring any bad habits, also to form their dispositions and to mutual kindness towards each other. No punishments were allowed in Oberlin and Sarah Benzel's school. The importance of training the mind young was stressed when the children were allowed to enter at 3 years. There were no books, children were taught by common objects. About this time some infant teachers reverted to the rod, consequently they lost favor. A great philosopher named Frederick Froebel seems to have understood the child much more intimately than most men. He says: 'We grant space and time to young plants and animals, so that they will grow properly and develop well. Infants are incapable of receiving instruction given to older children. When children play together (that is, without older people watching) they sharpen each other effectively. For the one does not surpass the other in depth of invention, and there is among them no assumption of superiority one over the other, only love, candor, and free questionings and answers. All parents know that the elder child does not learn as quickly as the succeeding ones. Training children is vastly different from teaching them. Froebels' kindergartens, or 'Children's Gardens,' were beginning to flourish. The teacher was the centre of attraction and was always in the limelight. She was to be bright, sympathetic, attractive in her dress, and the children liked to hear her talk. The present day kindergarten provides small chairs and tables, play aprons, little buckets and spades. This all lends an air of development to the children's minds. During Froebel's time came a marvel of the age in the person of Dr. Marie Montessori. Students came from all over the world to see her methods and attend her training schools. Her schools were called Bambini, and were situated in the poorer quarters of the city in Italy. She was a medical doctor, and Dr. Seguin gave her the advantage of his treatment of mentally defectives. She improved on his methods by providing material for these children to such an extent that these subnormal children were able to pass the ordinary school examination. Having succeeded so far, the idea came to her that she might do the same with ordinary normal children, though younger. The Montessori teaches, observes, directs, but in such a quiet manner that one does not notice her in the room. The children are so intent on their work that they pay no attention to anyone coming or going. The Montessori school gives the greatest freedom to the child. Each child recognises that the other child's interests are as important as his own. He marches to music, is told stories, sings the nursery rhymes, has a swing or a see-saw, and not a word about lessons. He learns his reading sounds by sense, touching sandpaper letters, over and over again. Everything which can be taught by touch and the senses is done. In conclusion, if our great grandfathers were to re-visit the scenes of long ago, they would be amazed at the rushing through the air at incredible speed, at telephone wires and thousands of wonders of electricity. All these have been accomplished by observing the laws of nature and studying them. Now the great advances which have been made in child study are no greater than these things, which can be brought about by honestly and sincerely studying the ways of the little ones. That is the essence of present infant training.'

CALTOWIE (Average annual rainfall, 16.94in.).

Meeting held August 18th. Present: 28 members. Addresses on the subject, "The Value of Crop Competitions," were delivered by Messrs. E. L. Orchard (District Instructor) and A. J. Symonds. Mr. R. Wilkinson offered a trophy for the crop competition which the Branch decided to hold. (Secretary, Mr. R. Wilkinson.)

#### EVERARD EAST.

August 6th.—Present: 12 members and visitors.

Mr. C. Hughes read a paper, "Which is the Best Breed of Fowl for the Farm." He favored the Barred Rock, because they were fair layers, good table birds, and did not fly on to sheds and haystacks. Mr. Hentschke recommended Black Orpington hens crossed



with a Minorca cock. General opinion was in favor of Black Orpingtons. Mr. G. Reinke then read a short paper, "How Long Does it Take Wheat to Malt?" After digging up seed he was of the opinion that it took from 10 to 14 days to malt. Where seed was only just covered it was quite sound and good, but any grain sown deep had grown, and when sown at medium depth perished. Mr. Colton said where he had sown deep the crop had come up, one float of his combine had become strained and did not go in as deeply as the rest, that strip had only half come up. Other members said that deep sowing had grown better this year, but most seasons shallow sowing seemed to be best. (Secretary, Mr. F. Hughes, Blyth.)

GLADSTONE (Average annual rainfall, 16.44in.).

August 22nd.

THE SALE OF FARM-GROWN PRODUCE.—Mr. J. Gale read the following paper:—"Most of the products grown on the farm have to be sold to buyers who decide the price they will pay and the farmer has to take the price that is offered. The farmers in South Australia are most up to date in their methods of farming, with the result that they get a large yield at the least possible cost per acre. We have Agricultural



#### KYBYBOLITE EXPERIMENTAL FARM.

Farmers' Day, November 18th, 1930. Baling Clover Hay.

Bureaus, Agricultural Shows, Crop Competitions, Fallow Competitions, Better Farming Trains, helping us to co-operate to grow larger and better crops, but when the crop is ready for market, each farmer offers his wheat separately in small quantities. The farmer does not take sufficient interest in the financial side of his business. The unionist has secured a uniform wage, and one cannot get a man below the basic wage, or a worker in the shearing-shed or factory without his union ticket. If the primary producers of Australia were united we would enjoy much better conditions than we do to-day. All other classes in the community, whether labor or capital, are organised, and use their weight in their own particular interest, which is often to our disadvantage financially. The primary producer should unite as he does in the Bureau to improve his method of production, to improve the marketing and financial side of his farm. If the producers of Australia were properly organised, they could have their own representatives watching their interests at home and overseas. The marketing of products such as barley, oats, skins, meat, butter, eggs, and dried fruit could be improved by the better organisation of the producer. The prices for farm products have fallen very low, and the only way to make the farm profitable is to reduce production costs, and, if possible, increase yields per acre." The paper provoked a keen discussion. (Secretary, Mr. F. Chick.)

JAMESTOWN (Average annual rainfall, 17.95in.).

Meeting held June 29th. Present: 15 members. Mr. J. O. Hatter (District Dairy Instructor) delivered an address, "Animal Nutrition."

On July 29th Professor A. J. Perkins, Director of Agriculture, delivered an address, illustrated with lantern slides, "The World's Position of Wheat." Twenty-two members and 40 visitors attended.



Fourteen members attended the meeting held on August 25th, when the following papers were read and discussed:—"Vegetable Gardening," Mr. W. Symonds, and "Care and Management of Agricultural Machinery," Mr. G. Napper. (Secretary, Mr. A. Bowness.)

#### MOUNT BRYAN (Average annual rainfall, 16.87in.).

Meeting held August 9th. Present: Mr. G. Goodridge (Chair) and eight members. An interesting paper, "Rural Conditions in England," was presented by Mr. T. Lloyd. (Secretary, Mr. H. Edwards.)

#### MURRAYTOWN.

Meeting held March 8th. Present: Nine members and three visitors. Mr. T. Drummond read a paper, "The Sunshine Header." (Secretary, Mr. E. B. Pitman.)

#### NELSHABY WOMEN'S.

August 7th.—Present: 15 members and visitors.

The Secretary read a paper, "Hints on Jam Making," given by Mrs. E. McCall at the Annual Congress last year. The paper was freely discussed, but members were of opinion that home-made jams and preserves were less expensive than buying the ready-made goods. Mr. K. Nolan read a paper on "The Flower Garden. The Secretary contributed a paper on the "Art of Dressing." (Secretary, Miss A. Lawrie.)

#### REDHILL (Average annual rainfall, 17.02in.).

August 5th.—Present: 12 members and visitors.

PREPARATIONS FOR DROUGHTS.—Mr. L. Simmonds read the following paper:—"In a lesser or greater degree, droughts affect every industry, and are the controlling factor in the law of supply and demand. The possibility of drought causes preparations to be made to guard against them in many ways. By fallowing, the farmer assists the soil to retain moisture which is the controlling factor of successful agriculture in a dry country. Also, fertilisers and new varieties of wheat help to reduce the effects of drought. The dry year of 1914 cost the settlers in new districts and the Government thousands of pounds, and the last three years have been a repetition of that experience. If farming had been carried on in the good years with the fear of a drought being experienced the next year, better provision for fodder supplies could have been made. Fallow well and early, and conserve all fodder available in good seasons. Cockey chaff mixed with oats makes an excellent food, and horses work well on it. If properly covered with straw cocky chaff will keep for years and prove a valuable asset in times of drought. A few stacks of straw are of a great value, and if salt is sprinkled occasionally over the straw as it is being stacked, its palatability will be increased. Whenever possible, every farmer should store more hay than will be fed in the year immediately succeeding the harvest in which the hay is cut. Try and conserve a supply which will last over two years. Saving oats and barley in good years is a suggestion well worth the consideration of every farmer. Most farmers on newly settled land are not in a position to store fodder, but the lessons of the last three years should teach every producer the advantage of preparing for drought." (Secretary, Mr. S. Pengilly.)

#### YANDIAH.

On the occasion of the Annual Meeting, the Secretary read the annual report and balance-sheet, officers were elected, and a programme of meetings arranged for the next session. (Secretary, Mr. F. Jettner.)

### LOWER-NORTH DISTRICT.

#### (ADELAIDE TO FARRELL'S FLAT.)

AUBURN WOMEN'S (Average annual rainfall, 24.12in.).

August 19th.—Present: 12 members and four visitors.

POULTRY KEEPING.—The meeting was held at Mrs. Kelly's residence. Members inspected the poultry pens. In discussing the management of the birds, Mrs. Kelly said the pens should face the north or north-east. She advised the provision of plenty of scratching litter in the pens to keep down the condition of the birds. The birds were fed on wheat, and at midday they were given finely chopped green feed. Mash was fed every other morning and plenty of shell grit and fresh water were always available. Mrs. Kelly made a practice of not keeping the birds after they were two years old. The incubators and brooders were also inspected. The chicks were fed on rolled oats and



No. 1 chick food, with warm water to drink. After they were three weeks old No. 2 chick food was given and the chicks were allowed the run of the scratching pen. (Secretary, Mrs. B. Burfield.)

On August 15th Miss E. Campbell, of the Education Department, gave an address, "Home Economics." There was an excellent attendance, including members from the Saddleworth and Wirrulla Women's Branches.

#### HANSON.

An excellent meeting was held on August 4th. The meeting took the form of a debate, the subject being, "Is the land in this district too dear?" Speakers debating the affirmative were Messrs. C. Turner, J. Hogan, W. Woollacott, and H. Schumacher, whilst the negative was supported by the following members from Black Springs:—Messrs. C. Heinrich, H. Rodda, R. Turner, and J. Howard. Black Springs won the debate by eight points, totals being—affirmative, 347; negative, 355. The Rev. Lawson, of Koorunga, adjudicated the debate. (Secretary, Mr. J. Boehm.)

#### LIGHT'S PASS.

The meeting held on August 4th was attended by 40 members and visitors. Papers on price fixing were read by Messrs. C. Verral and N. Mader. An interesting debate followed, the general opinion being that so long as prices fixed were reasonable and growers stood firm to their agreements and did not under sell, there would be beneficial results. (Secretary, Mr. C. Verral.)



#### MUNDALLA AGRICULTURAL BUREAU.

Field Day, November 12th, 1930. Visitors inspecting Subterranean Clover and Grass Pasture.

#### MODBURY.

The monthly meeting of the Branch was held at Golden Grove on August 6th, there being present 11 members and six visitors. An address, "Fodder Crops and Their Cultivation," was delivered by Mr. W. J. Spafford (Deputy Director of Agriculture). (Secretary, Mr. M. Murphy.)

#### OWEN.

August 6th.—Present: 15 members and 100 visitors.

Annual Meeting.—The annual social in connection with the activities of the local Branch was held in the institute on August 6th. The Chairman of the Advisory Board (Mr. F. Coleman) addressed a large gathering of members and visitors on the subject, "How to Use Your Bureau." He stressed the importance of farmers utilising their sidelines, particularly dairying, in view of the depression of the wheat market and the annual shortage of dairy produce in South Australia. Mr. W. Johnson (District Agricultural Instructor) and Mr. W. Brownrigg (Agricultural Instructor for Eyre Peninsula) were also present. The retiring Secretary (Mr. A. N. Freebairn) gave a report on the Bureau's activities for the past year. Prizes won in connection with the Balaklava District Wheat Crop Competition were presented by Mr. F. Coleman, the successful competitors being, first, Mr. J. Harkness; second, Mr. W. McPharlin; third, Mr. B. Reid. Representatives from the Alma, Balaklava, and Nantawarra Bureau Branches were present. A musical and elocutionary programme was provided. Supper was served by the ladies, after which the evening concluded with a dance. (Secretary, Mr. A. Bowyer.)



## PENWORTHAM.

The meeting of August 7th was held at Seven Hills, and was attended by 25 members and a large number of visitors, including members from the Clare and Watervale Branches. Addresses were delivered by Messrs. W. J. Spafford and W. C. Johnston, of the Department of Agriculture. (Secretary, Mr. A. Jenner.)

## RIVERTON (Average annual rainfall, 20.86in.).

Mr. D. Hannaford presided over an attendance of 27 members and 134 visitors at the meeting held on August 11th, when Mr. B. Crewe, of the Vacuum Oil Co., gave an address, illustrated with moving pictures, "Oil and Its Products." (Secretary, Mr. O. Longbottom.)

## SADDLEWORTH (Average annual rainfall, 19.65in.).

Eleven members and visitors attended the meeting held on August 8th, when an instructive paper, "Sport and Recreation in Conjunction with Farming" was contributed by the Secretary, Mr. A. Blundell.

## TARLEE (Average annual rainfall, 18.16in.).

Meeting held July 8th. Present: 15 members and two visitors. Papers on the subject, "Systems of Marketing Wheat," were contributed by Messrs. G. Cornish and L. M. Molineux.

Sixteen members attended the meeting held on July 29th, when Messrs. A. Hill and N. Clarke read papers, "Farm Side Lines."

A further meeting was held on August 19th, when W. C. Johnson (District Agricultural Instructor) delivered an address, "Weeds and Grasses." (Secretary, Mr. D. Kelly, Giles Corner.)

## TRURO (Average annual rainfall, 20.21in.).

August 11th.—Present: 24 members.

DAIRYING AS A FARM SIDE LINE.—The following paper was contributed by Mr. J. Miller:—"Dairying as a side line on the farm is not only a payable proposition, but a necessity, inasmuch as it provides three of the valuable foods of life in milk, cream, and butter. The fortnightly cream cheques are also a great help in the home in making ends meet. In the skim milk we have a food which is unequalled in the raising of young pigs. The number of cows which a farmer should keep will depend largely upon the size of his holding and the help of his family. I would suggest for an average farmer the keeping of five cows, and an attempt should be made to keep four in milk. The cows should be milked regularly, thoroughly, and quickly. For the most suitable breed of cattle I favor the milking Shorthorn. This type of animal, when it has served its purpose as a milker, can be fattened and sold to the butcher at a good figure. There is also a better demand for a good Shorthorn calf than for those of most other breeds. During that part of the season when feed in the paddocks is scarce cows should be fed twice daily on chaffed hay and crushed oats (cocky chaff in drought years only). Every farmer should endeavor to grow all the fodder, otherwise the keeping of any kind of stock will not be profitable. Some farmers will feed a useless horse on hay, yet expect the cows to maintain their condition and produce milk on cocky chaff with a very small allowance of bran. A cow should be fattened and sold to the butcher after she attains the age of 12 years. If possible, a small paddock should be reserved for the cows close to the homestead so that time will be saved by having the cows handy at milking time. A cow should be given at least six weeks rest before calving, and two weeks prior to that six weeks should be allowed for drying off. I do not favor a cow having a calf more often than every 18 months. A heifer should be at least three years old before she has her first calf; if the heifer is allowed to get in calf when too young her growth will be very much checked. Great care should be taken with the milking of the heifer, there are many good cows spoilt by neglect during their early life. Such troubles as blind teats, calloused udders, &c., develop from neglect. The young calf should be given new milk for at least the first 14 days of its life, and then gradually weaned on to separated milk with a little Meggitt's meal added, and fed until it is three months old, when it can be turned out, providing there is good feed in the paddock. If a calf is intended for market, then very often it pays to sell before they are three months old. A young calf will often learn to drink much easier if given its own mother's milk for the first few drinks. If a heifer calf is to be reared, it should be handled quietly at periods during its young life, so that when it has its first calf little trouble will be needed in getting it to stand quietly to be milked. I do not favor leg-roping cows, the rope only makes them kick more, and if cows get at all upset they will not give their milk freely." (Secretary, Mr. L. Davis.)



## WASLEYS.

Mr. E. Fischer presided over an attendance of 40 members at the meeting held on August 14th, when Mr. F. Gilbert, lecturer on Poultry at the Roseworthy Agricultural College, gave an address, illustrated with lantern slides. In the course of the address he emphasised the necessity of producing the infertile egg, as was essential for export purposes. He advised selecting the best hens and male birds for breeding. The good hens could be judged by their heads. If hens and cock birds were allowed their freedom together often the hens stole their nests and hatched chicks of an inferior nature, similar to herself, as would be a spring layer, which is not to be recommended, as it is a poor hen that isn't laying during spring. The younger birds should not be allowed to feed with the older birds. Select the best birds after six weeks and concentrate on them. Change of fodders was necessary. The morning feed should be an easily digestible one, such as bran and pollard mash, green feed at midday; barley and oats could be fed as a change, but fowls should not be kept on these grains for any length of time, as they caused digestive trouble; malt barley was preferable to Cape barley. If birds were moused they should be supplied with meat food, also shell grit should be given, as 137lbs. of carbonate of lime was utilised by 100 fowls producing 100 eggs annually. Care must be taken of eggs for incubation purposes, and if kept for any length of time prior to being placed in the incubator, should be covered, to prevent moisture evaporation. After eggs are placed in the incubator, two days should elapse before being turned. The airing should be increased as the hatch progresses. The chicks should be separated as soon as the sexes can be determined. (Secretary, Mr. C. Currie.)

## WATERVALE (Average annual rainfall, 27.24in.).

June 16th.—Present; 27 members.

CULTIVATION IN RELATION TO VINEYARDS, DEALING PRINCIPALLY WITH CONSERVATION OF MOISTURE.—Mr. T. Sobels read the following paper:—"Vines that are cultivated require cultivation for a variety of reasons, the main reason being that they are placed under natural conditions, consequently they have a keener struggle for existence. In a dry country, one of the chief difficulties is the absorption of a sufficient quantity of moisture. We are told that average plants will contain from 70 per cent. to 80 per cent. of water. Moisture is constantly evaporating through the leaves, and this loss has to be made up by other absorption. It is estimated that to produce one ton of hay it requires approximately 250 tons of water, and 1 in. of rain represents 100 tons to the acre. Therefore, if no losses were to occur and the rain fell as required, a rainfall of about 2½ in. would be sufficient. Only about one-quarter of the rainfall is used by the plants, fully one-half is lost by evaporation, and the rest soaks away. Therefore our main object is to prevent as much of this evaporation as possible. So far as cultivation is concerned, it may be divided into two parts. Firstly, the storage in the soil of as much moisture as the rainfall will allow, and secondly, the prevention of the loss of this moisture as far as possible until the succeeding rainy season. At the end of autumn the soil has become more or less consolidated. Every operation after the bursting of the buds naturally tends to increase this. Summer cultivation is shallow, simply a stirring of the surface, leaving it hard and solid below. Even sandy soils, as a rule, contain a certain per cent. of clay, tending to set them on the surface. As soon as the rain falls in winter, the surface being hard, the greater percentage of water simply runs away, particularly on slopes, and even if level the water collects on the surface and much again evaporates without going any depth. If, however, the soil is broken up to get below the summer cultivation, the greater part of it soaks into the soil. Therefore I would advise the breaking up of a vineyard as early as possible, according, of course, to the district and rainfall. There is no doubt, however, that whatever precaution is taken the moisture that is in the soil must diminish. Firstly, by evaporation, owing to rise in temperature as the summer advances; secondly, by the action of violent winds; thirdly, by the gradual heating of the soil by the direct rays of the sun; and fourthly, robbing of moisture by weeds and any other foreign growth. The latter, of course, we are able to deal with. The action of cultivation is not confined entirely to the storing of moisture, by the cultivation of the soil we force the plants to send their roots down deeper than they otherwise would do. Plants require an abundant supply of free oxygen, and soils which are not cultivated become rich in carbon di-oxide, owing to the respiration of root gases. Scientists have told us that 10 per cent. of carbon di-oxide is contained in pasture land. This tends to cripple the plants and hinders their growth, hence breaking up of the soil exposes their lower layers and sets free the poisonous gas. Cultivation may be divided into three stages, viz., winter, spring, and summer. The winter cultivation is given as early as possible after the ground becomes ploughable, and is only necessary to the dryer districts. Spring ploughing is mostly practised here, and should be of a good depth, varying from



4in. to 6in. In trellised vines the crown should be made in the centre of the rows, throwing the furrow away from the vines, plough as closely to the vines as possible, then the remaining land is taken away by the horse hoe. Later on this should be ploughed back, leaving a furrow in the centre of the rows, which is worked over by the use of the harrows and cultivator. In bush vines in this district only one ploughing has been found necessary, and that is to strike out or crown up one row, leaving the furrow on the next, the remaining land being taken away by the horse hoe. Each row is done every alternate year in this manner; one row is backed up and the other ploughed away, and so on. Before summer cultivation I recommend the use of the harrow. This not only pulverises the surface, but assists the cultivator to do the work more thoroughly and lessens the wear and tear of implements. The number of times you cultivate in summer depends chiefly on weeds and the season. Loosen up the soil after every rain where practical, to prevent as much evaporation as possible. Summer cultivation places a loose layer on the surface, which sometimes encourages the growth of surface roots, but the deep winter or spring ploughing tends to destroy these, so the deeper one can force the roots of a vine down the better will they withstand droughty conditions, the small surface roots being of no value. In an uncultivated soil much loss is due to capillarity. When a soil sets hard it forms a crust on the surface, and although the particles tend to cohere, you never obtain a perfectly compact mass. The soil is really perforated with a series of minute tubes connecting the lower strata of the soil with the atmosphere, and through these tubes the moisture is constantly rising and is lost by evaporation from the surface. Breaking up the surface remedies this, and practically the only loss will then be by evaporation from the surface layers. Shallow cultivation in the summer, leaving a lower layer on the surface, acts in much the same way as a mulch."

#### WILLIAMSTOWN WOMEN'S (Average annual rainfall, 27.84in.).

Mrs. Rowe presided over an attendance of 10 members at the meeting held on August 6th. Mrs. Hill tabled recipes and samples of marmalade and pickles. Mrs. Wild gave a demonstration of root grafting. (Secretary, Mrs. C. Cundy.)

### YORKE PENINSULA DISTRICT.

#### (TO BUTE.)

#### ARTHURTON (Average annual rainfall 16in. to 17in.).

The meeting of August 4th was held at the residence of Mr. L. Lamshed. Mr. J. Hentschke presided over an attendance of 21 members and five visitors. An address, "Improving the Farm Flock," was delivered by Mr. W. J. Spafford (Deputy Director of Agriculture). (Secretary, Mr. T. Howlett, Moonta.)

#### BRENTWOOD (Average annual rainfall, 15.67in.).

August 7th.—Present: 14 members and three visitors.

**PIGRAISING FOR THE FARMER.**—Mr. C. Boundy contributed the following paper:—"For breeding purposes I prefer the Old Spot mother, the sows are very quiet and rear large litters, and crossed with the Duroc-Jersey boar produce quick growing pigs, which develop a good side of bacon. Pig grazing has many advantages over sty and yard rearing. Properly carried out it is more profitable and far less laborious than intensive hand feeding. From the time it is born the sucker learns to root and fossick for itself, and thus naturally becomes hardy, healthy, and less susceptible to swine fever; and the mother will, as a rule, throw bigger litters and rear more of the youngsters than when confined in small spaces for a long time. It is advisable, however, to move the sow into a sty, with a protective beam 5in. from the ground, a few days before farrowing, and leave her there for about a week after the young are born. This ensures protection from possible bad weather and from interference by other pigs during farrowing. If this is done, care should be taken not to change the diet too suddenly and not to overfeed. Pigs will put on weight more quickly when fossicking in good pasture, such as lucerne or Cape barley, but growing or fattening pigs, especially the latter, should be given an additional grain ration of, say, crushed oats, wheat, barley, or peas; charcoal and old bones should also be fed. All grain food should be crushed; feeding whole grain is wasteful; and a plentiful supply of fresh water should always be available, whether in yards or pasture. Shelter-sheds should be provided in the paddocks, and shady trees are almost an essential in hot weather. Where pigs are grazed, greater numbers can be raised with the same manpower than when in confined quarters. Feeding costs are greatly reduced, the bacon or pork will be firmer with more tendency to streak, the necessity for milk is eliminated, though



milk is always a valuable food, and the stock, when fit for market, can stand the journey without hardship. As live weight increases the greater the quantity of feed required to maintain the pig at his existing weight. Five pounds of corn, or its equivalent, will produce a pound of gain in a young pig; it will take nearly that to keep a 200lb. pig at the poundage; the younger they are when they reach the 120lb. (dressed) weight the more profitable. A pig that is putting on 1½lbs. per day is showing more profit per pound of feed eaten than one that is increasing at 1lb. or less. The pig farmer ought to make more use of ashes. Pigs are often seen picking up all kinds of rubbish, and afterwards are found to be suffering from stomach trouble. This habit points to some deficiency in the food; the animals are looking for something to balance the ration. Those fed largely on maize will particularly develop a craving for rubbish. The remedy is a heap of ashes placed in a dry spot handy to the pigs. Pigs relish ashes, and the younger they get the habit of eating them the better. There will be no indigestion and no signs of constipation. There will be no pig eating if the sows have been brought up on ashes. It is a good thing to mix a little salt with the ash now and again." (Secretary, Mr. G. L. Tucker.)

**BUTE** (Average annual rainfall, 15.88in.).

August 21st.—Present: 10 members.

Mr. Trengove, in introducing for discussion the subject "Fodder Conservation," said, in good seasons, many farmers were apt to neglect this most important aspect of

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farm management. It was always advisable to stack in heaps, well protected from the weather, as much cocky chaff as possible. During winter, cattle and young horses did very well on it. A stack of either barley or oats hay would also prove a valuable standby. A good discussion followed. (Secretary, Mr. L. Simon.)

#### KILKERRAN.

Thirteen members attended the meeting held on August 12th. Mr. A. Sawade read papers entitled "The Economic Position of the Farmer" and "Tractor v. Horses" from the *Journal of Agriculture*. A good discussion followed. (Secretary, Mr. A. S. Dutschke, Maitland.)

#### PASKEVILLE (Average annual rainfall, 15.67in.).

August 5th.—Present: 18 members.

**DRILLS AND THE COMBINE.**—Mr. W. Cox, in reading a paper on this subject, said the combine had proved of very considerable benefit to the settler on new lands, because of the fact that he could do two operations in one, save the expense of an extra machine and extra labor, and work over comparatively rough land. He gave preference to the spring tooth combine, because it made an ideal seed bed, and it was able to cope with rubbish, such as straw and bushes, much better than any drill. Again, with the combine, one was always up with the work; in wet weather, if using the cultivator and drill and a heavy rain fell, it would perhaps be some time before one could get on the land, and the fallow that had only been cultivated would in all probability have to be worked again. With the combine some farmers were inclined to expect too much from it, they asked it to do more than the machine was intended to do. They expected the combine to cut up a strong growth of weeds and still do justice to sowing the seed. If it could be avoided, the combine should not be used for working the fallow. The combine was a machine which was greatly abused. The tynes became strained when working hard ground, which resulted in the seed being buried unevenly and at too great a depth. The drill could be used to excellent advantage for sowing cereals for early feed on stubble land before rain. He inclined to the belief that crops sown with a drill gave better returns than those sown with a combine, but the advantage of the latter outweighed any increase in yield that might be obtained from the use of the former. (Secretary, Mr. J. Prouse.)

#### PETERSVILLE.

August 5th.—Present: Nine members.

Mr. R. Dutschke read a paper, "The Effect of Super on Crop Growth," which aroused an interesting discussion. Discussing the advisability of harrowing a growing crop during August, members were of the opinion that if the harrows were not too heavy and the ground not too dry, the harrowing would prove of benefit to the crop. (Secretary, Mr. A. Dutschke, Ardrossan.)

#### SOUTH KILKERRAN.

In the presence of a large attendance of members and visitors, an officer of the Royal Automobile Association delivered an address, illustrated with moving pictures. (Secretary, Mr. H. Schrapel.)

#### YORKETOWN (Average annual rainfall, 17.04in.).

August 12th.

The meeting took the form of a "Question Box." "Is it possible for pickled barley to come up without taking root?" *Answer:* "Yes, but it will not live." "When is it best to start shearing?" *Answer:* "The condition of the wool will help to determine that question. When the wool has a healthy appearance is the best time." "Does it pay to skirt fleeces?" *Answer:* "Yes, skirt lightly, and take out backs that are dirty." "Does it make any difference to the price of wool if bales are made to weight of 4cwts. or over?" *Answer:* "No." "What is a good remedy for a horse that is rubbing hair off itself?" *Answer:* "Get a stick of strong tobacco, put it in 1gall. of water, and bring this to the boil. Wash the horse with this solution, and it will effect a cure." "What is the correct amount of wheat to sow in this district?" *Answer:* "The season is the leading factor. If it is a dry season and late, 80lbs. to 90lbs. of the late varieties, 90lbs. of early varieties. If the season is favorable, 60lbs. of stooling varieties and 90lbs. of those that do not stook greatly was advised. The same remarks apply to barley. The character of the seed has a marked effect on results, especially under favorable conditions." "Does it pay to prune tomato plants?" *Answer:* "Yes. The Early Dwarf is one of the best varieties for this district." "Is horse manure best for cucumbers?" *Answer:* "No. Pig manure is better, because it is not so heating. Sow tomatoes on a patch that has had cabbages on it as previous crop." Mr. A. Heitmann explained the use of "hot-kaps" and their advantage. (Secretary, Mr. C. Stead.)



**WEAVERS (Average annual rainfall, 17.03in.).**

Meeting held July 14th at Mr. F. Anderson's homestead. The following papers were read:—"The Open Market for the Disposal of Farm Produce," Mr. L. Slade, and "Pooling Farm Produce," by Mr. F. Anderson. A keen discussion followed. Twenty-two members and four visitors attended. (Secretary, Mr. H. Cornish, Stansbury.)

**WEAVERS (Average annual rainfall, 17.03in.).**

Mr. C. F. Anderson (Acting Poultry Expert) delivered an address, "Eggs and Poultry," at the meeting held on August 11th, which was attended by 17 members and four visitors. (Secretary, Mr. H. Cornish, Stansbury.)

**WESTERN DISTRICT.****GOODE.**

**INSURANCE AGAINST DROUGHT.**—The following paper was read by Mr. A. Brown:—"Farmers of Australia as a whole have had very lucrative seasons. But it cannot be denied that lean seasons or absolute failures have also been the lot of the Australian farmers. Having these two extremes in mind, it is a matter of wonder to me that among all the farmers who have suffered these periodical losses someone has not thought of a way to provide during their bounteous seasons for the lean years which are sure to follow. We have very good examples in the friendly societies where the members, though not sick or ailing in any way, put their equal share into a fund to enable them when sickness comes to pay for their doctors and medicines, and also draw sufficient out per week to keep the house going during their illness. Had the farmer started on the same lines, say, 20 years ago, a huge sum of money would now be available. Anyone who has gone through the last four years and suffered the hardships which this prolonged drought has entailed, will agree that although the State Bank and the Government have done their very best for the drought-stricken farmer, an insurance fund of their own, where they were fully entitled to draw a certain sum per acre sown, would be very much preferable to asking the State Bank for advances or the Government to assist. By the latest reports it seems that it is not only droughts that we have to provide against, but prices of wheat, which stand to-day 50 per cent. under production cost. The remedy lies, in my opinion, in insuring against loss by drought, or loss by prices being below production costs. I will, therefore, commence by using as an illustration a 48,000,000bush. harvest in South Australia; I would then, by Act of Parliament, compel all farmers to leave with the pool or the merchants 3d. per bushel, that would amount to £100,000. The Government would be asked to subsidise this amount by 10s. in the pound. This amount would be loaned to the Government for three years, adding the same amount to it each year plus interest. At the end of the three years we would have just on half a million pounds. With that capital we could commence to operate, as cost per acre also returns per acre varies in different localities, so, of course, would returns per acre from the insurance fund also vary. In localities around here I consider 500 acres as much as a man can handle at seeding time on his own. Properly put in that man should receive 10s. per acre (£250), or equal to £5 per week, if a total failure is recorded. In other localities, where the cost of working the ground and extra seed and super is required, the returns should be up to £1 per acre per year. It must be here understood that any sum drawn for sale of wheat would be deducted from this amount. Should any farmer be in the happy position of not having to draw at all, a bonus at the end of each five years would be paid to him. Extra allowance would be made for farmers with help for extra acreage, approximately 5s. per acre between the 500 acre and 1,000 acre mark. The present agricultural instructors would be the judges in their respective districts to see that proper attention would be given to the preparation of the land and the seeding thereof."

**GREEN PATCH (Average annual rainfall, 26.56in.).**

August 7th.—Present: 10 members.

Replying to a question as to whether top-dressing had any effect on increasing the size of sheep, most members were of the opinion that since applying artificial manure to pasture lands in the Green Patch district the size of the sheep had considerably increased. Mr. P. Sinclair said it was difficult to increase the quantity of the wool and quality of the fleece without decreasing the size of the carcass. *Codlin Moth.*—This subject was also introduced for discussion. It was reported that although in some instances stronger solutions of arsenate of lead had been sprayed on the trees, codlin infested fruit was still in evidence. As a further precaution it was suggested that cases which had contained fruit should be dipped in a solution of salt and water. (Secretary, Mr. C. Whillas, Port Lincoln.)



**KYANCUTTA.**

The inaugural meeting of the above Branch was held on August 12th. Twenty-four names were enrolled as foundation members, and six new members were added to the list at this meeting. Mr. F. Daniels was elected Chairman and Mr. D. Fitzgerald Secretary. It was decided to hold meetings on the first Tuesday in each month, and that for the months of December and January the Branch would go into recess.

**MALTEE.**

At the Annual Meeting of the Branch, which was held on August 7th, the report of the past year's work was presented by the Secretary, and officers elected for the ensuing term of office. (Secretary, Mr. E. Schwarz.)

**MILTALIE** (Average annual rainfall, 13.89in.).

The annual meeting of the Branch was held at the residence of Mr. D. Ramsey. The President (Mr. P. Story) presided over an attendance of 17 members and 15 visitors. The Secretary (Mr. G. Smith, of Cowell) presented the annual report, which showed a gratifying increase in the attendance at meetings from eight to 14.

**MOUNT HOPE.**

August 5th.—Present: Nine members.

**ADVICE TO SHEEP OWNERS.**—In a paper on this subject, Mr. D. Speed said much publicity had been given to the necessity for advancing the wool industry, and the public were quite familiar with the slogans "Wear more wool" and "Use more wool." The speaker thought that some attention should be given to the need for developing a higher-priced wool. The fine-woolled sheep produced a heavy fleece. A point that growers would do well to bear in mind was the importance of marketing wool of a uniform quality. Wool of the latter type was certain to realise the best price. Their district was ideal for the production of a fine medium type of wool, and farmers should mate their flocks with that object in view. The Secretary, Mr. J. Vigar, presented the annual report, and officers were elected.

**PYGERY.**

August 5th.—Present: 19 members.

An instructive paper setting out the good points of the various makes of combines and drills was presented by Mr. G. Duggin.

On July 16th a large number of members and visitors attended a wool-classing demonstration given by Mr. C. A. Goddard, of the School of Mines, at the homestead of Mr. E. Edmonds. In the evening Mr. Goddard spoke on "Classing the Farmers' 'lip.'" (Secretary, Mr. A. Day.)

**RUDALL** (Average annual rainfall, 12.14in.).

August 5th.—Present: 12 members.

**FALLOWING.**—In a short paper on this subject, Mr. H. Henderson said fallowing should commence as early as possible after seeding. The first working should be done with a medium weight plough, turning the soil to a depth of 2½in. to 3in. After all stumps, stones, &c., had been picked, the fallow should be worked with a spring-tooth cultivator, working across the ploughing. Following every rain, the cultivator should be used to assist in the conservation of moisture. Each working should be slightly shallower than that of the previous cultivation. If it was not possible to get on to the fallow after rain, sheep could be used to keep weeds in check. The meeting was held at the residence of Mr. B. Crabb. (Secretary, Mr. J. McKinnon.)

**TARAGOBO.**

The annual meeting was held on August 7th, there being present 18 members. Following the report of the Secretary and the election of officers a discussion took place on shearing and wool classing. (Secretary, Mr. T. W. Winters, Cleve.)

**WARRAMBOO.**

August 5th.—Present: 21 members.

**FENCING.**—Reading a paper on this subject, Mr. D. McKenzie said some landholders inclined to the opinion that fencing was a job to be done only when there was no other work to do on the farm. Good fences were an essential factor in the management of a well-equipped farm. Anyone who had had experience with straying stock would know the annoyance caused by fences in bad repair. The choice of material played a very important part in the construction of a fence. All posts should be of the same height, set in as straight a line as possible and at equal distances apart.



That could be done without any trouble if a chain was used. A fence 3ft. 6in. high was usually sufficient to keep most livestock within bounds, but an extra 2in. was advisable for the boundary fence. The wires in a fence 3ft. 6in. high should be spaced as follows:—Ten inches between the barb and top plain wire, then 8in., 7in., 6in., and 5in. between each succeeding wire, with the bottom wire 6in. from the ground. For a permanent fence, he recommended 12½ gauge high-tension wire, provided the strains were not made too tight. Struts were essential, and they should not be too short, otherwise they were inclined to lift the posts when the wires were strained. A good plan was to put in a post about 10ft. from the strainer, and place the strut against the bottom of it and between the two top wires of the strainer, when it would be impossible to pull over the strainer post when straining the wires. A forked stick with a hole bored in the end made an efficient straining tool. When boring, the holes should be bored in the direction in which the fence was running, otherwise it would be difficult to pull the wires through the posts. In stony country, iron droppers could be used to advantage. A strong fence under such conditions could be erected by placing four iron droppers between wooden posts placed 20ft. apart. In rebuilding an old fence, old wire should be carefully examined for rusted places. All spare pieces of wire should be collected and taken out of the paddocks. Gates in the fences should be wide enough to allow a team to pass through, and gates in regular use should be so constructed that they could be opened and shut with ease. Fences should be attended to regularly, broken wires repaired, and posts replaced where necessary. Shoots and other rubbish should be cleared away from fences to prevent the collection of drift.

FENCING.—The following paper was read by Mr. P. Palmer:—"The erection of permanent fences will eventually save the farmer time and money. If the holding is pestered with rabbits netting is, of course, the best material to use for the fence. With a plain wire along the top of the netting and another 12in. from the ground, the netting will not be dragged up should sheep run over it. If there were no rabbits to contend with, then cyclone fencing is recommended. This type of fence will not be covered with drift, and it can be erected in less time. Five plain wires with a barb on top also makes a very satisfactory fence. As to the height, I consider 3ft. 6in. the ideal. Good posts not less than 5in. in diameter at the top and placed every chain or 25yds. with five heavy flat-iron droppers between makes an excellent foundation for a fence. A good pair of pliers and a strong straining jack that can be used between strains for effecting repairs are necessary tools for the fencing equipment." Discussing the papers, Mr. P. Daniels said in strutting the strainers it was better to place the strut low down on the post. If that was done it did not interfere to the same extent with the boring of the post and pulling in the wires. Mr. A. Turner supported the argument of the writer of the paper that the higher the strut was placed on the strainer the better. Mr. O. Murphy said the strut should be placed at an angle of 45°, and it would not allow the strainer to lift. He considered that a six-wire fence could be erected more cheaply than a cyclone fence. Discussion took place on the use of concrete posts, the general opinion being that to manufacture them would prove too expensive. Mr. F. Chilman referred to netting fences and admitted that if rabbits were bad they were almost a necessity, but their great disadvantage was that buck bush collected against them, and if drift was bad the fences soon became ineffective. Mr. J. Sampson emphasised the importance of placing the bottom wire of the fence sufficiently low to keep sheep from crawling underneath it. (Secretary, Mr. E. Adams.)

WUDINNA (Average annual rainfall, 13.68in.).

Eleven members and three visitors attended the meeting held at Mr. Johnson's residence on August 4th. The Hon. Secretary (Mr. C. Newbon) read a report of the work performed by the Branch during the past year, and officers were elected.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

### BLOCK E.

August 12th.—Present: 14 members.

Mr. L. White gave an interesting talk on "How to fill in income tax papers." Mr. C. P. Smith, who with Mr. P. John has always judged this Branch's Pruning Competitions, presented the pruning cups and trophies to this year's winners: Mr. A. Pietsch first in vines and Mr. M. Pethick second; Trees: Mr. M. Pethick first and Mr. A. Nenke second. Mr. C. P. Smith offered to donate a prize next year to the best competitor in the pruning competitions who has not previously won a prize, to try and encourage more competitors. He also offered to give pruning demonstrations. As an



appreciation of past services to the Branch Mr. W. Edmonds, on behalf of the Branch, made a small presentation to Messrs. Smith and John. Mr. M. Pethick donated a cup for the best green manure crop. (Secretary, Mr. H. Davies, Renmark.)

#### BOOLGUN.

August 7th.—Present: 16 members.

FENCING AND SUBDIVIDING THE FARM.—In a paper on this subject Mr. T. Spencer, for the boundary, recommended a fence consisting of posts 5yds. apart with 20 posts to each strain, five plain and one barb wire. Strainer posts should be 9in. to 12in. in diameter, placed at least 3ft. in the ground and supported by strong struts. The height of the fence should be 3ft. 6in., and the wires spaced as follows from the ground level:—The first four wires each 6in. apart, the fifth 8in., and the barb placed on top of the post, 10in. above the last plain wire. If posts were difficult to obtain, they could be placed half a chain apart, and two or three wooden droppers used between each post. The subdivision of the farm should be so planned as to permit of easy stock watering facilities. He preferred paddocks of about 100 to 150 acres in area, with two or three paddocks containing not more than 40 or 50 acres. Plenty of gates should be provided, and these should be wide enough to permit the passing through of the largest implements on the farm without having to unyoke the team. He advised six wires for the gates, making them 6in. above the fence. If at all possible, one should avoid running the division fences over sandhills. These latter fences should be 3ft. 3in. high, with four wires and one barb, spaced as follows:—7in., 7in., 7in., 8in., and 10in. If plenty of posts were available, place them 5yds. apart. Barb wire should be tied to the posts. Last, but not least, "do not forget to leave shelter belts or clumps of trees for shelter for the stock." Mr. Spencer advised cutting timber for posts during June and July. (Secretary, Mr. J. Palm.)

#### BRINKLEY.

Eighteen members attended the meeting held on August 6th. Mr. L. Rust read a paper, "Experimental Farms and Their Value." A good discussion followed. (Secretary, Mr. C. Pearson.)

#### BUGLE.

General business was transacted at the meeting of the Branch held on August 26th, which was attended by Mr. J. S. Todd (Chair), 12 members, and two visitors. (Secretary, Mr. B. Auricht, Taldra.)

#### CALIPH.

Meeting held August 5th. Present: 10 members. Mr. J. Burnett read a paper, "The Most Profitable Utilization of Sheep on the Farm," which aroused a keen and instructive discussion. (Secretary, Mr. W. Todd.)

#### CLANFIELD (Average annual rainfall, 16in. to 17in.).

Meeting held August 13th. Present: Eight members and a large number of visitors. The Deputy Director of Agriculture, Mr. W. J. Spafford, addressed the meeting. (Secretary, Mr. W. Pearce.)

#### COPEVILLE (Average annual rainfall, 11.58in.).

Meeting held August 13th. Present: Mr. J. Collins (Chair), eight members, and a large number of visitors. Mr. C. Goddard, of the School of Mines, gave a demonstration and lecture on wool classing. (Secretary, Mr. G. Sutherland.)

#### KANNI, August 9th.

There was a good attendance of members and visitors at the August meeting. Discussing the question of sidelines on the farm, sheep, cows, and pigs, were considered to be the most profitable. The Merino sheep was favored, and cows would prove a valuable asset providing the attention which they demanded did not make too great a call on the time of the man who had to look after the teams. A member spoke on the advisability of conserving fodder in the form of ensilage. (Secretary, Mr. F. Woodland, Waikerie.)

#### KULKAWIRRA.

The meeting held on August 11th was attended by 19 members and nine visitors, when addresses were delivered by Messrs. W. J. Spafford and R. L. Griffiths, of the Department of Agriculture. (Secretary, Mr. H. Elliot, Karoonda.)

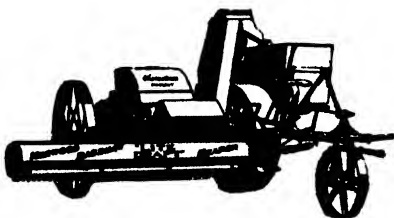


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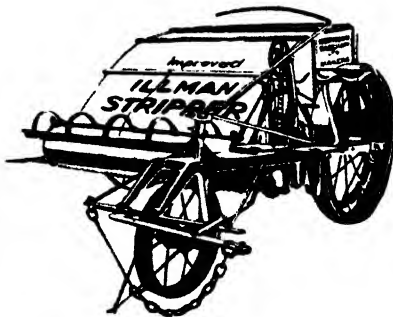


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# THE IMPLEMENT COMPANY

**BANK AND BLYTH STREETS, ADELAIDE.**



## LONE GUM AND MONASH.

Mr. J. Brown presided over an attendance of 19 members at the meeting held on August 4th. A report of the past year's work was presented, and officers elected for the forthcoming year. (Secretary, Mr. R. Nancarrow, Lone Gum.)

## LOWBANK.

Twelve members attended the Annual Meeting, which was held on August 4th. Following the presentation of the Secretary's annual report, officers were elected and a programme of meetings arranged. (Secretary, Mr. L. Geyer, Waikerie.)

## MARAMA.

Fourteen members and two visitors attended the meeting held on August 5th, when Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Wheat Varieties." (Secretary, Mr. T. Hinkey.)

## MERIBAH (Average annual rainfall, 11.70in.).

August 11th.—Present: 17 members.

SAND IN HORSES.—Discussing this subject, Mr. W. Mason recommended the use of sand powders. Mr. W. Young had had good results with coffee. Messrs. L. Galley and C. Wishart pinned their faith to carbonate of soda and ginger. Other matters of local interest were discussed. (Secretary, Mr. E. Carr.)

## MILLENDILLA (Average annual rainfall, 13in.).

August 4th.—Present: Seven members.

CONSERVATION OF FODDER.—A paper on this subject was read by the Secretary, Mr. V. Wegener. In the discussion that followed it was stated that the main fodder for conservation in this district was wheaten hay, well stacked and covered, and if it was to be kept for a period of years it was advisable to put a galvanized-iron fence around the stack. This should be let well into the ground, several feet out from the stack; if, when placed against the stack, straw or hay falling down fell against the outside of the fence and provided a means for the mice getting back into the stack. It was thought that straw would keep better than cocky chaff if the latter was kept longer than two years. With age straw became softer and was relished better by stock. Cocky chaff was of very little value for feed after the second year. Several members said that putting salt between each layer of hay or straw as it was put down also kept out mice, besides greatly increasing the feeding value. The Secretary said that every farmer should erect a stack of straw in the paddock which, during rough weather, provided shelter, and even in a good season some was eaten by the stock. He had noticed that his sheep were eating the straw he had conserved from the last harvest, especially during wet weather. The trouble with most farmers was that after a drought they made a good start by conserving fodders, but after a few years forgot all about droughts. There were also some farmers who, owing to financial difficulties, were unable to cut much hay, because they had to gather every bushel of wheat possible to meet their creditors. Such a thing should be avoided if at all possible, as it did not pay. QUESTION BOX.—"Is it likely that a paddock containing mustard would flavor the meat of sheep if grazed off by them?" If the sheep to be killed were taken off the mustard several days before killing, then the meat would be free from the flavor of the weed. "Why do weeds germinate better on land that is ploughed, drilled, and harrowed than if only ploughed and left as fallow?" The extra working encouraged germination. Some farmers were using the cultivator, scarifier, or combine for fallowing this year, which seemed to give a quicker and better germination of weeds, besides reducing production costs and minimising drift. Fallowing was done earlier and quicker, which was an advantage in a late season. This practice will be watched with interest, as it is still in the experimental stage with some farmers in this district.

## MOORLANDS (Average annual rainfall, 14.76in.).

Nine members and three visitors attended the meeting held on August 19th, when the District Agricultural Instructor (Mr. R. L. Griffiths) delivered an address, "Cultivation and Rotation of Crops." (Secretary, Mr. L. Ortloff.)

## MYPOLONGA.

June 23rd.—Present: 11 members.

The Secretary presented the annual report, and officers were elected for the ensuing 12 months. The Annual Pruning Competitions were held on July 3rd in Messrs. Victory's and Foster's orchards. Mr. E. Leishaman (District Instructor) acted as judge, and



Messrs. K. Dowding and B. Pickering assisted as consultative judges. Mr. A. Wedd secured the highest aggregate in trees and vines, Mr. A. Burrett second, Mr. A. Milde third, and Mr. N. Angrave fourth.

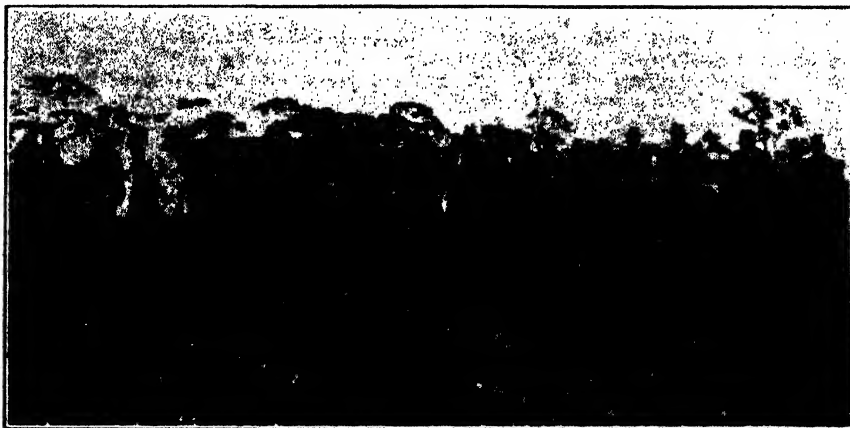
A further meeting was held on July 30th. The meeting took the form of a debate on the subject, "Orchard Work v. Dairying," and papers in support of the orchard were read by Messrs. Pickering and Edson; the value of cows on the orchard was supported by Messrs. Noles, Hill, Prosser, and Collins. (Secretary, Mr. L. Haynes.)

#### NETHERTON.

Meeting held August 6th. Present: 14 members. Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Wheat Varieties for the Mallee." (Secretary, Mr. C. Wilkin, Yumali.)

#### NUNKERI.

Meeting held August 6th. Present: 15 members. Mr. H. Sanders read an instructive paper, "The Farm Water Supply." A good discussion followed. (Secretary, Mr. F. Ling.)



#### KYBYBOLITE EXPERIMENTAL FARM.

Farmers' Day, November 13th, 1930. Visitors inspecting Pasture Plots.

OVERLAND COENER (Average annual rainfall, 10.58in.).

Mr. J. Atkinson presided over an attendance of 15 members and four visitors at the meeting on August 5th, which was held at the residence of Mr. J. Loffler. An address, "Hints on the Management of Sheep," was delivered by Mr. Raggatt, of Morgan. (Secretary, Mr. H. Loffler.)

#### PARUNA.

The meeting of August 1st was attended by the Chairman (Mr. A. Webb) and 20 members. After the annual report had been presented by the Hon. Secretary (Mr. F. Sumner) and the election of officers had taken place, a paper, "Tractive Power and Farm Machinery," was read by Mr. A. Patterson.

#### PINNAROO.

The meeting of August 13th took the form of a social evening. Addresses were delivered by Messrs. F. Coleman and P. H. Jones, of the Advisory Board of Agriculture, and Mr. H. C. Pritchard, General Secretary of the Agricultural Bureau. Musical items were contributed, and supper was provided by the members of the Pinnaroo Women's Branch. (Secretary, Mr. H. Badman.)

#### PINNAROO WOMEN'S.

The Annual Meeting of the Branch was held on August 1st, and was attended by the President (Mrs. Dowd) and 13 members. The annual report was read and the election of officers followed. (Secretary, Mrs. F. Atze.)



**RENMARK (Average annual rainfall, 10.60in.).**

Members and visitors to the number of 48 attended the meeting held on August 11th, when addresses were delivered by Messrs. H. B. Barlow and P. H. Suter, of the Dairy Branch of the Department of Agriculture. Mr. A. Hilton, of the Murray Bridge Agricultural School, also addressed the meeting. (Secretary, Mr. W. Meier.)

**WAIKERIE (Average annual rainfall, 9.71in.).**

Fourteen members and eight visitors attended the meeting on August 15th. Addresses on the subject of keeping a few cows in conjunction with fruit growing were delivered by Messrs. H. B. Barlow and P. H. Suter, of the Department of Agriculture. (Secretary, Mr. E. Rowe.)

**WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).**

Twelve members and 14 visitors attended the meeting held on August 8th, when Miss E. Campbell, Dip. Dom. Econ., of the Education Department, delivered an address, "Home Dressmaking and Fancy Stitchery." (Secretary, Mrs. A. Oram.)

August 19th.—Present: 12 members and eight visitors.

**THE HOME ATMOSPHERE.**—Mrs. H. Billing read the following paper:—"A good house wife will not rest content with the fact that her meals are well cooked. She will also see that they are well served, knowing that dainty table equipment and skilful service do much to enhance the enjoyment of the fare provided. No matter how simple a meal may be, it should be placed neatly upon the table and made attractive to the eye. The decoration of the meal table should be confined to such decorative needle work as will launder, together with the glint of the silver and glass ware (both as good of its kind as can be afforded), the prettiness of the china, and flowers, and foliage which are always in good taste. If amongst these are placed temptingly arranged dishes, the table will look not only attractive, but also hospitable. Remember the motto, 'A housewife's art is displayed in a table well laid.' The clean cloth, the bright silver and glass, the tidy and pleasant room—well ventilated—with tasteful floral decorations, will add to the enjoyment of the meal. The table is the special centre of most homes. Certain table refinements are amongst the ameliorating influences which help to cultivate the mind and improve manners." (Secretary, Mrs. A. Oram.)

**YURGO.**

August 4th.—Present: Eight members and six visitors.

**FALLOWING.**—The following paper was read by Mr. J. Bullen:—"Fallowing is a system of cultivation which assists the soil to store moisture and make food available to plants. It also helps to control plant diseases and prepare a seed bed for the coming season's crop. Before ploughing, see that the land to be fallowed is free from rubbish. Sheep will assist in this direction and increase the fertility of the soil by converting weeds into manure. The droppings enrich poor soils, and the beneficial effects of sheep on sandy soil cannot be over estimated. For fallowing I favor the mouldboard plough. It buries all weeds and makes a level seed bed. Depth of ploughing will be governed by the nature and condition of the soil, and also the time of fallowing; usually sandy soils can be ploughed at a depth of 2in. to 3in., and clay loamy soil 3in. to 4in., the depths to be reduced if for a short period fallow. If a loamy soil crumbles readily in the hand it is generally in good condition for ploughing, but sandy land can be ploughed wet. Work up the clay and loamy soils first, they are capable of holding more moisture and are richer in plant foods. Clay or loamy soils should not be ploughed when too dry, because it requires more power, turns up large clods of earth, and does not invert the furrow into a mellow, crumbly condition. The next operation is harrowing crossways to the plough, to break down all clods, fill in air pockets, and level the surface. Fallow should be worked after every rain. I favor at least one working with the cultivator and two workings with the harrows, but this must be done after a rain. For a working with the cultivator, not less than  $\frac{1}{2}$ in. of rain must have fallen. Cultivating destroys weeds and prepares a firm seed bed. When cultivating do not go deeper than 1 $\frac{1}{2}$ in. to 2in. Any type of cultivator will do to work the fallow, so long as it is in good order. Avoid using a disc implement, because the depth of working cannot be regulated. If the land is inclined to drift, do not use the harrows after the first working, and work crossways with the cultivator to the direction of the prevailing winds. Do not put sheep on fallow that have been grazing on stubble of a diseased crop. Well worked fallow should not require grazing with sheep." (Secretary, Mr. M. Walker.)



**SOUTH AND HILLS DISTRICT.****BLACKHEATH.**

At the meeting of the Branch, held on August 14th, there were present Mr. H. Paech and 11 members. The annual report and balance-sheet were presented and officers elected for the ensuing term of office. Mr. Law read portion of the Departmental Bulletin, "Pig Raising." (Secretary, Mr. E. Paech, Rockleigh.)

**CHERRY GARDENS (Average annual rainfall, 35.03in.).**

The meeting of August 2nd was held at the residence of Messrs. H. and K. Jacobs, there being present 12 members. Members inspected the apiary, vegetable and fruit garden. A pruning demonstration was given by Messrs. I. and A. Stone and K. Jacobs. A flock of ewes with lambs at foot was favorably commented upon. Afternoon tea was provided by the ladies. (Secretary, Mr. A. Stone.)

**GUMERACHA (Average annual rainfall, 33.54in.).**

Meeting held August 4th. Present: 12 members and two visitors. Mr. S. Cornish read a paper, "Farm Buildings," and a good discussion followed. (Secretary, Mr. L. Wise.)

**KANGARILLA WOMEN'S.**

The subject for the meeting held on August 14th was "Household Hints." Seven members attended, each of whom brought forward a useful hint in connection with women's work on the farm. (Secretary, Mrs. M. Steer.)

**MOUNT BARKER AGRICULTURAL BUREAU.**

Field Day, October 22nd, 1930. The Chief Dairy Instructor (Mr. H. B. Barlow) explains the good points of a Dairy Cow.

**LANGHORNE'S CREEK (Average annual rainfall, 14.84in.).**

August 6th.—Present: 14 members and three visitors.

Mr. C. A. Whittlesea provided an interesting paper, "Fallowing," which promoted good discussion. Mr. Dodd asked why deeper ploughing for sand was advocated? In reply Mr. Whittlesea stated that heavy land was too sour, whilst in many sands deeper ploughing brought up heavier land. Mr. Natt inquired whether reploughing was advisable? The writer said that unless weeds had so much hold that ploughing was the only effective method, reploughing was not advisable. (Secretary, Mr. H. Pollett.)

**LENSWOOD AND FOREST RANGE (Average annual rainfall 35in. to 36in.).**

August 25th.—Present: 10 members.

**PACKING AND EXPORT OF APPLES.**—Mr. G. Schultz read the following paper:—"Many people overlook the importance of packing if the best returns are desired. As an example, take two cases of apples; one with the top uneven, an apple here and there showing bare, and plenty of ends of paper sticking up; the other with the top level, every apple well wrapped up, and the loose ends hidden. Will not the case that is



well packed bring more than the other in the open market? The price of packing is 5d. per case. Let us assume that a man is packing 60 cases a day. One grower will say to the packer, "You are making too much money, you will have to pack for 4d." The packer rushes the work and packs 75 cases to make the same money; needless to say, he does the sort of job we had in mind first. Another man will say, "Make a good job and I will pay accordingly." The packer does 50 cases and gets 6d. per case. Which grower is going to make the most profit? Further, it is easier to pack 50 cases really well than 60 cases fairly well or 75 cases in a slipshod manner, and so the job becomes more attractive to the packer and he will be looking for a job next year. It is not suggested that the grower will automatically receive 2s. per case extra if he pays 1d. per case more for packing, but if good packing is done generally, packers would soon become more plentiful and growers would be in a position to demand better packing. It would not cost much per case to make the work so attractive that packers would pack just as one wanted them to, rather than lose the job. One side of the question must not be forgotten; it is a job that only lasts a few weeks and, in South Australia at any rate, only every other year. Most men leave regular work to take it on, so the job must be made attractive if we are to get good packers. Having good packers, it is necessary to bring them good fruit, well graded to pack. The best packer cannot put fruit in the cases in good condition if it is brought to him bruised in the picking or grading. There is more harm done to apples before they reach the packer than after. This is where we have lost our profit in export apples. I have packed Jonathans, good color, well matured, and quite clean, as good apples as could be desired, and they were sent away on the same consignment, under the same brand, with nothing to distinguish them from apples that were almost green with plenty of scab. I have seen apples badly withered sent with apples in first-class condition. This leads to the probability of opening one case of apples and finding it good, buying a parcel on that sample, and finding the rest green and scabby or withered. There is no need to say what happens. The costs on apples overseas are about 7s. 6d. per case, so that the grower must realise about 11s. per case before he starts to reckon his profit, and he has no right to expect anyone to pay that for them unless the fruit is put up in first-class condition. Under present conditions there is a wide range of apples that can be placed under standard grade. Before we can expect anything like top price for our apples, we will have to put them up in more grades, so that a buyer when he opens a case or two will know what to expect from the whole consignment. Again, we brand our cases with the size of the apples, while the buyers are asking for the count. This means better sizing. Grading to 1/4's is reliable enough for counts; they would have to be graded to 1/8ths. I have heard growers say this year "South Australian apples are bringing nearly as much as those from New Zealand." Is there anything to be proud of in the fact that New Zealand, a country that started on this export trade 30 years after us, is beating us at it? Is there any reason why New Zealand growers should get a better price for their apples than we get for ours? I am not prepared to admit that they grow better apples. Then they must put them on the market in a more attractive way. If they can do it, so can we. We hear on all sides of the improvement in this year's apple pack. It will be agreed that it was not in the apples themselves. Then where was the difference? A little in the style of packing and the rest in a better case. When one hears growers refer to making 2s. per case on these two items, it makes one wonder what growers would get if the apples were picked carefully and graded well. It seems we have gained a little on New Zealand and Western Australia this year, but there should be no excuse for being behind them at all." (Secretary, Mr. B. Laurence.)

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MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

Meeting held August 12th at the residence of Mr. H. Seager. Present: Five members and visitors. Matters of a formal nature were brought forward for consideration. (Secretary, Mr. J. Wood.)

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MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

August 16th.—Present: 34 members.

CARE OF THE BREEDING EWE.—Mr. R. Frahn read the following paper:—"In this district, ewes should be mated about the end of November or the beginning of December; about 70 to 80 ewes per ram if the rams are healthy and in good condition. Ewes should not be too fat when mated. After mating, they should have plenty of exercise and not too much feed. Grazing on hilly country is preferred; this will keep them strong and healthy. Crutching should be done about four weeks before lambing and



the wool removed from the udder, especially around the teats, to give the lamb every chance of sucking immediately it attempts to do so. Always have a good paddock in reserve with plenty of feed, and when the ewes start lambing turn them into it. Through the summer good, clean, stock water is essential. A mill tank and troughs are best; the troughs should be cleaned out whenever they become dirty. Troughs near roads are of little use; they are often used as bathing pools by dogs and the sheep will be disturbed. Farmers often make the mistake of having the breeding ewes in a weak state, and when they lamb foxes begin to trouble them. Often the fox is not to blame for dead lambs lying about the paddock. With poor, weak ewes, there are always a few lambs that die after birth, and that is when foxes become troublesome. If ewes are healthy and strong, they will be able to rear good, healthy lambs and will, to some extent, be able to protect them from danger. Every care should be taken when crutching ewes in lamb." For the breeding of lambs for slaughter, Mr. A. Braendler favored the Dorset-Merino cross. The Suffolk-Merino cross also produced good lambs. All agreed that the Shropshire-Merino cross lamb was excellent, but trouble was experienced at lambing time, because that lamb had an exceptionally large head and many ewes had to be assisted. (Secretary, Mr. F. C. Altmann.)



#### KEITH AGRICULTURAL BUREAU.

Field Day, November 11th, 1930. Crop of Peas on the property of Mr. A. W. Shannon.

#### SCOTT'S BOTTOM.

The meeting of August 9th was held at the residence of Mr. J. Blakely, and was attended by 10 members. An instructive paper, "Grasses for the District," was contributed by Mr. Brenton. (Secretary, Mr. E. Atkinson, Cherry Gardens.)

#### SPRINGTON.

August 6th.—Present: Eight members.

CULTIVATION OF THE VINEYARD.—Mr. E. Brokate read a paper on this subject, and in the discussion that followed the general opinion of members was that the soil should be ploughed to a depth of 4in. or 5in. at the end of August or early in September, then harrowed and cultivated or scuffed four or five times. The harrows were considered to be the chief implement, and should be used freely. Hoeing would also assist in keeping weeds under control. (Secretary, Mr. E. Brokate.)

#### STRATHALBYN (Average annual rainfall, 18.22in.).

Meeting held August 5th. Present: the Chairman, Mr. C. Lund, and a good attendance of members and visitors. Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) delivered an address, "Fallowing and Seeding." (Secretary, Mr. F. Allison.)

#### TWEEDVALE (Average annual rainfall, 36.08in.).

On the occasion of the annual meeting, which was held on August 14th and attended by 18 members and visitors, the Hon. Secretary, Mr. B. Schapel, presented the annual report, and officers were elected for the ensuing year.



# CROWN LANDS.

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## LANDS OPEN TO APPLICATION.

Lands in the Hundreds, as shown below, are open to application until 3 p.m. on Tuesday, January 13th, 1931.

Lands in the Hundreds of BARNA, BICE, BLACKER, BOOTHBY, BUCKLEBOO, BURGOYNE, CALDWELL, CHILLUNDIE, COCATA, COHEN, COLTON, COOTRA, CUMMINS, GILES, GOODE, HAGUE, HASLAM, HORN, KIANA, KOONGAWA, MITCHELL, MOSELEY, NICHOLLS, NUNNYAH, PEACHNA, PEARCE, PINKAWILLINIE, PYGERY, RIPON, RUSSELL, SOLOMON, TOOLIGIE, WALLALA, WANNAMANA, WOOKATA, WUDINNA, YALANDA, YANINEE, and YARANYACKA.

Full particulars are published in the *Government Gazette* of November 20th, 1930, and plans and detail may be obtained on application to the Director of Lands, Box 293A, Adelaide.

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## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Box 293A, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

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## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



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**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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S. R. WHITFORD.  
*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### Registration of Dairy Farms.

The Minister of Agriculture (Hon. S. R. Whitford, M.L.C.), recently stated that the Government had given serious consideration to the position brought about by the decision of the late Government not to insist on dairymen registering their premises under the Dairy Industry Act. The provisions of this Act practically removed dairymen, except in the metropolitan area, from supervision by local boards of health and substituted supervision by the Dairy Department. The result of the late Government's decision on the matter was that, except in the metropolitan area, there had been no supervision of dairy farms at all during the past year.

Those portions of the State included in the metropolitan area, the whole of the West Coast, the counties of Albert, Alfred, Buccleuch, Chandos, Cardwell, and Carnarvon, the municipalities of Port Augusta, Davenport, and Quorn, the district councils of Coglein, Orroroo, Port Germein, Woolundunga, Hammond, Carrieton, Kanyaka, Hawker, and Morgan, are exempted from the Act. In any other part of the State it was unlawful for any person to carry on dairying unless the farm was licensed as provided in the Act, and the Government had decided that these provisions of the Act must be complied with. Fees were payable before July 1st last, but in view of the fact that the Act was not put into operation last year dairymen were given up to January 1st to apply for licences for the half-year ending June 30th, 1931, and to pay the necessary fees. The fee for the half-year was 3d. per cow, with a minimum charge of 5s. Where less than six cows were kept no fees were payable, but the dairy must be licensed. Under the Act, dairy farm means any land or premises where cows are milked or kept for the purpose of producing milk for sale either as milk, cream, butter, or cheese. Forms of application for licences were obtainable from the police officers at all stations within the area to which the Act applies, and also from the District Dairy Instructors.

### Agricultural Statistics.

The International Institute of Agriculture at Rome has recently published the "International Year Book of Agricultural Statistics." The volume contains 800 pages dealing with the world situation from the geographical, political, and demographical points of view, the apportionment of cultivated areas between different crops, agricultural produce, different kinds of livestock, yields, &c. A portion is devoted to the weekly quotations of 25 agricultural products in the principal world markets for 1913 and 1926 to 1930, as well as freight charges, statistics of production with the uses of fertilizers and their prices. Special chapters deal with the importance and distribution of the agricultural population and the distribution of agricultural holdings according to their size and mode of tenure and forestry.

### Sweden as a Market for Australian Produce.

An article on this subject appears in the *Swedish-Australian Trade Journal* under the pen-name of "Observer," who quotes the following statistics to show how Australian direct trade with Sweden has increased during the last 25 years:—

#### *Australian Trade with Sweden, 1904-1928/29.*

| Year.             | Imports.<br>£ | Exports.<br>£ | Total.<br>£ |
|-------------------|---------------|---------------|-------------|
| 1904 . . . . .    | 78,274        | 966           | 79,240      |
| 1928-29 . . . . . | 1,480,808     | 413,938       | 1,894,746   |

In addition to direct exports to Sweden, there is probably a very considerable Australian export to Sweden through other countries, regarding which there are no statistics available. The possibility of an extension of exports is discussed from the figures showing exports from Australia for the fiscal year 1928-29 and the imports





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into Sweden for the calendar year 1929. In the case of *Wool*, the imports from Australia are less than one-fifth of the total imports, and a considerable expansion in this trade seems possible. Sweden imports about £3,000,000 value of *Wheat*, and of this only £148,000 value is imported direct from Australia. With good seasons in Australia, increased exports to Sweden should be established. Next to the United Kingdom and Germany, Sweden was the most important market for Australian *Apples* during 1928-29. Direct exportations to that country amounted to £27,000; but in addition large supplies of the total Australian export were probably transmitted to Sweden through Great Britain and Germany. The total imports of apples into Sweden were almost equivalent to the total export of apples from Australia. There appears to be a growing demand for apples in Sweden, and as Australian apples reach that market when supplies from other sources are more or less depleted, the market for our produce may still be considerably improved. There should also be a much larger direct export of Australian *Hides* to Sweden, which imports a value of £960,000, of which Australia supplies, direct, about £16,000. Australia, again, should also be able to extend her exports of *Tallow*, in which Sweden has a fairly large import trade. Markets are also available for *Fresh Fruits* (other than apples), and the Australian trade with Sweden is small. The bulk of imported *Preserved Fruits* comes from the United States, and out of a total importation in all of £84,000, only £1,300 is credited to Australia. As far as Sweden is concerned it would be worth investigating whether it would not be possible to find a good market here for this class of product. Australia is not mentioned in the Swedish statistics of imports of *Hair* for 1929, although a very small quantity was actually sent in 1928-29, when the total value of Australian exports to all countries was about £29,000, which is a little more than half the total imports into Sweden. There seems also to be a direct market for *Sausage Casings*. Most of our export trade in this line goes to United States and Germany, both countries sending large quantities to Sweden. Out of the large export of *Sheepskins* from Australia only a very small value (under £200) was sent to Sweden in 1929. The Australian direct exports of sheepskins to Sweden appear too small when one considers the good market in this country, which imports a value of about £100,000. There have been small exports of *Honey* to Sweden, and as the price of the honey imported into that country is about twice that of the honey exported from Australia, there seems no reason why Australian honey could not be exported to Sweden. Markets are waiting for other products, such as *Dried Fruits*, *Oats*, *Wines*, *Furred Skins*, *Tanning Bark*, *Casein*, and *Metals*, as well as other lines, which, however, do not seriously interest this State. The members of the Swedish Chamber of Commerce are desirous of assisting Australian producers and exporters to find larger markets in Sweden. The writer affirms that of all the countries in Europe, Sweden appears to have been the least affected by the world depression, and her markets, therefore, should be able to absorb and pay for many of the commodities that now are a glut on other markets.

#### **Publications Received.**

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

Official Guides to the towns of Huddersfield, Dudley, Runcorn, Wakefield, Ossett.

The Rowett Research Institute, Collected Papers, Vol. II., 1930.

### **AGRICULTURAL INQUIRIES.**

[Reply supplied by Prof. A. J. PERKINS, Director of Agriculture.]

#### **Analysis of Pollard.**

Two samples of pollard, one lighter in color than the other and costing 2d. per bushel extra, were submitted by the Longwood Branch of the Agricultural Bureau, with the question as to whether the feeding value of the lighter colored sample was worth the



extra 2d. per bushel. Reply—The following analytical data has been supplied by the Director of Chemistry:—

|                          | No. 1 Sample.<br>Per cent. | No. 2 Sample.<br>Per cent. |
|--------------------------|----------------------------|----------------------------|
| Moisture . . . . .       | 8.61                       | 8.62                       |
| Ash . . . . .            | 1.81                       | 2.34                       |
| Protein . . . . .        | 12.19                      | 14.15                      |
| Fats . . . . .           | 1.98                       | 3.87                       |
| Starchy matter . . . . . | 73.46                      | 65.78                      |
| Fibre . . . . .          | 1.95                       | 5.24                       |

The lighter color is probably due to a higher proportion of flour in No. 1 than in No. 2, and hence the higher proportion of starchy matter, 73.46 per cent. in No. 1 and 65.78 per cent. only in No. 2. On the other hand, the higher proportion of husk in No. 2 leads to a darker color and a higher proportion of protein, namely, 14.15 per cent. in No. 2 and 12.19 per cent. only in No. 1.

For definite comparison it is necessary to determine what is known as the starch equivalent for each sample, that is to say, the number of pounds of starch to which 100lbs. of each sample corresponds as a foodstuff. I calculate the starch equivalent to be 57½ for sample No. 1 and 57½ for sample No. 2. It follows that, from the standpoint of feeding value, there is not much to choose between the two, particularly at present current prices.

If sample No. 2 were worth 1s. a bushel, No. 1 would not be worth more than 1/20th of a penny extra, and No. 2 would have to reach the fantastic figure of 38s. 2d. a bushel before No. 1 could be worth as feeding material 2d. a bushel more than No. 2.

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[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

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#### Lucerne.

Questions submitted by a correspondent at Currency Creek:—

1. When establishing lucerne, in August, I applied a bag of 45 per cent. superphosphate per acre; would it have been better if I had used stable or pig manure? Reply—Superphosphate is the best fertiliser to use when establishing a stand of lucerne. Unless farmyard manure is well rotted before application, or is ploughed in before bare fallowing, so many weeds germinate at the same time as the lucerne that the crop suffers. Now that the lucerne crop has been established, farmyard manure can be applied with advantage in late July or August, and weeds which do appear will not interfere with the lucerne plants.

2. Would it be advisable to manure the lucerne crop again? Reply—Lucerne should be manured every year, and as it is also advisable to cultivate the lucerne crop every year, the two operations can be carried out at the same time. In July each year the soil should be thoroughly stirred with a cultivator with very narrow shares, and then 2cwts. superphosphate drilled in to the acre. If the land is sandy, heavily weighted harrows will do all the cultivation necessary. If farmyard manure of any kind is available, it can be applied before the cultivation.

3. What is the best way to eradicate lucerne flea? Reply—We have had success by feeding down the affected crop, then spraying with about 80galls. per acre of a mixture of 10lbs. arsenate of lead, 2 quarts of nicotine arsenate, 500galls. of water.

4. Can you recommend a sprinkler that will water a good distance under fairly low pressure? Reply—Nearly all sprinklers do better work when there is a fair pressure of water, and if a big throw is desired high pressure is essential, still the Rain-maker type of sprinkler throws the water a fair distance, even when the pressure is fairly low.



**Nitrate of Soda for Top Dressing.**

Does top dressing with nitrate of soda in dry, hot, windy weather have any effect in burning off crops? (Weavers Agricultural Bureau.) Reply—Nitrate of soda will burn the foliage of cereal crops if allowed to remain in contact with it for any length of time, particularly if some moisture collects on the foliage. If the nitrate of soda broadcasted on to the crops was dissolved in the moisture deposited from dews, it would probably burn the foliage. Nevertheless, no damage to crops is to be expected because of top dressing with nitrate of soda in the ordinary course of events, and even in exceptional circumstances the harm done to the foliage should only be very slight.

**Salt Bush.**

Can seed be obtained of the salt bush growing at the Waite Research Institute, and can it be grown in this district? (Wallala Agricultural Bureau.) Reply—The salt bush being grown at the Waite Research Institute is *Atriplex semibacatum*, and seed of this kind can be purchased from most of the large seedsmen. Judged by the way it grows and has spread at the Minnipa Experimental Farm, it should do fairly well in the Wallala district.

**Free Gallipoli Wheat.**

Is Free Gallipoli wheat suitable for this district? (Wallala Agricultural Bureau.) Reply—Free Gallipoli may do fairly well in the Wallala district, but it is a wheat more suited to heavy rainfall and good agricultural conditions.

**Oats for Feed and Hay.**

What is the best class of oats to sow to feed off and then leave for hay? (Palabie Agricultural Bureau.) Reply—It is not reasonable to expect oats to give a hay crop after having been heavily grazed, except in the very best of agricultural conditions, and it is a pure gamble to try it in most of our mallee districts. If this method of hay-growing is to be chanced, then there is more chance of success with early varieties of oats, such as Early Burt, Palestine, or Bathurst Early.

**Poa aquatica.**

Possibilities of *Poa aquatica* (water meadow grass) as a fodder grass? (F. B. F., Jamestown.) Reply—*Poa aquatica* appears to have done remarkably well in some parts of Australia, but there seems to be something about our climate or the quality of the waters of our lagoons and low-lying flats which does not favor the grass. Quite a lot of people have tried the grass in various parts of the State, but I know of no one who has had full success. There is more chance of success with Strawberry Clover than with *Poa aquatica* on low-lying soils frequently covered by water.

**Field Peas for the South-East.**

Is there a variety of field pea suitable for the black soil of the South-East (similar to Penola soil) which could be planted in late October? (Coonawarra Agricultural Bureau.) Reply—In the pea-growing districts of this State, the seeding is done about June, and we have no varieties of field peas sufficiently early maturing to permit of such late seeding as October, even in the South-East. The Brunswick White, which is a good deal earlier than the other common kinds of field peas, can be sown at a later date than the others, but in all probability October seeding would prove quite unsuitable in most seasons.

**Grey and Blue Peas.**

Market quotations show a difference in price for grey and blue peas. What is the difference? Reply—The difference in price between grey and blue peas does not appear to always favor the one kind, and seems to depend upon the supply of each





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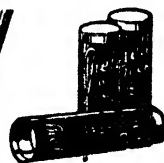
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variety on hand at any given time. The grey peas are locally grown, but the blue peas come from Tasmania, and as the supply and quality vary a good deal, according to the season, so does the price.

#### **Sodium for Control of Mustard and Dock.**

Would sodium chlorate be likely to prove effective in checking mustard and dock, and what is the price commercially of sodium chlorate? (Coonawarra Agricultural Bureau.) Reply—Sodium chlorate would kill both mustard and dock if sufficient quantity of a 5 per cent. solution be sprayed on the plants to thoroughly wet them. As this material will burn the green growth of all plants, the spraying must be done when the land is out of crop, and it must be remembered that it leaves the soil sterile for some little time after spraying. Crude sodium chlorate is about £45 a ton, and can be purchased from Hardie Trading Pty. Ltd., Currie Street, and Cresco Fertilizers Ltd., North Terrace.

#### **Red Rust.**

Is a fungus classed as a disease? (Marama Agricultural Bureau.) Reply—A reasonable definition of "disease," as taken from the dictionary, is—"a derangement in the structure or the function of any organ belonging to a vegetable, or an animal organism, or to any organised body." When such a derangement is caused by a parasitic fungus the disease is then known as a fungus disease. Although some fungi can cause diseases, because they are parasitic or living organisms, many of them have no connection with diseases, as they are not parasitic and get much of their sustenance from dead organic matter.

Is rust a disease or fungus? Reply—Red rust is a fungus disease, *i.e.*, it is a fungus which grows on plants as a parasite, taking all of its food requirements from the host plant on which it lives.

Is rust caused by humid conditions followed by heat, and does it do less damage in thin crops? Reply—Red rust is a fungus growth on the plants, which develops very rapidly in muggy weather, *i.e.*, in warm, moist weather conditions, and does most damage in thick, luxuriant crops which have grown very quickly. Light, open crops, which dry out readily and admit moving air easily, are rarely badly affected by the disease.

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[Reply by R. C. SCOTT, Superintendent Experimental Work.]

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#### **Irrigation of Lucerne.**

"W. A. R.," Lyndoch: "I have half an acre of deep sandy soil; water is laid on 5 chains away. If I could get two cuts lucerne by average rain, would it pay to irrigate to get a third or fourth cut, with water at 1s. per thousand gallons excess rate." Reply—With water at 1s. per thousand this is not likely to prove directly profitable. However, it must be remembered that supplementing the ordinary ration with a proportion of green lucerne makes a considerable difference to the milk yield of your cows. To get maximum returns the lucerne must be watered between each cut at the rate of at least 6ins. of water per acre. In many irrigation settlements an acre-foot of water is supplied. An application of 6ins. of water equals 134,400galls. per acre; with green lucerne valued at £1 per ton this means that each cut must yield 6 tons 14cwts. per acre to pay for water at 1s. per thousand gallons. Naturally the quantity of water utilised would be reduced by the amount of rain recorded. Lucerne will give fair returns with much less water, but unless it is available at cheap rates, it is not advisable to attempt to irrigate a plot of any size. With average summer rainfall, you should secure two fair cuts, and it is suggested that if half an acre is planted, you irrigate, say, half this area. The irrigated portion would yield four cuts, at a cost of about £4 for water. The green stuff obtained would be of great benefit to your cows, and in my opinion, the expense of irrigation would be justified. However, the area so treated should not be large. In the class of soil mentioned, namely, sand overlying clay at a depth of about 3ft., it would be best to irrigate by means of the sprinkler.



**HORTICULTURAL INQUIRIES.**

[Replies supplied by Mr. G. QUINN, Chief Horticultural Instructor.]

**Budding Fruit Trees.**

Is it advisable to bud apricots and peaches on almond trees? (A. J. M., Cherry Gardens). Reply—The almond is only desirable as a stock for peaches and apricots when certain soil and drought conditions have to be overcome. Soils which are too highly calcareous or dry for peach or apricot roots will not seriously injure the almond. Generally speaking, unless exceptional advantages are offered for the fruit grown in the locality, the almond is not a commercial success as a stock for these fruit trees.

**Prevention of Disease in Potatoes.**

“W. G. E.,” Kalangadoo, asks for details of treatment to prevent disease in potatoes. Reply—In the first place, without seeing a potato affected by the particular disease you have to contend with, I am at a disadvantage in offering any advice owing to the great number of diseases in potatoes, each of which is due to an entirely different organism or cause.

As you mention formalin, I may say that compound has been used in solution as a dip for seed potatoes affected by “scab” on the skin—“scab” said to be caused by a fungus (*Actinomyces* sp.).

If, therefore, the disease you have in mind is “scab,” the formalin treatment consists of dissolving 1lb. of commercial formalin in 30galls. of water. Place the seed tubers in a loose, open-woven sack and steep them for a couple of hours before cutting if they are not whole seed. Anyway, if cut or not, they are allowed to dry off before planting. A very deadly poison, commonly known as corrosive sublimate, used similarly at the rate of 1oz. in 6galls. of water has proved very effective. It is dissolved in a little hot water and then poured into the 6galls., which are placed in a wooden

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In case I have not located the disease you desire to prevent, the best course would be to send me an infected tuber or some diseased haulms to enable identification being made.

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### The "Off Year."

Commenting on the established fact that many fruit trees bear a big crop in one year and a small crop in the next, and that two good years rarely follow one another, Mr. Chas. H. Beaumont (District Horticultural Instructor) stated that he has noticed that some orchards bear well on the general "off year" and bear only a few fruits on the general "big year"; indeed, individual trees in the orchards also show this peculiarity, so that climatic conditions and insect interference cannot be held to have any special effect; nor can it be attributed to the stocks, because at least 90 per cent. of the stocks used are similar in every respect. Nearly every orchardist has his own special idea on the matter, and many are trying to demonstrate their theories and to overcome the trouble to some extent.

Last year there was a general big crop—bigger than usual—and the reason that it was bigger was probably due to the fact that the trees were weaker owing to the lack of winter rains. Weak trees usually set heavier crops than vigorous trees; they aim to reproduce themselves before passing out, and so set a big crop of what is mostly inferior fruit, inferior in size, inferior in quality and in color; hence, artificially weakening trees are not a good commercial proposition.

Last year some of the growers in his district decided to prevent a number of trees from bearing by removing the blossoms. One grower actually cut off the flowers of several fair-sized trees; others spoiled all chance of pollination by burning the flowers with a spray of lime-sulphur strong enough for the purpose; others, again, pulled off the fruit when it was big enough to handle easily, and in one neglected orchard all the fruit was knocked off so that the owner might be relieved from the necessity of spraying to control codlin moth. In all these instances a crop has set this year; whilst other trees near by, not so treated, are bare or nearly so. Whether the procedure will alter the habit of the tree permanently remains to be seen.

He has examined trees which had been treated with fertilisers in the hope that a second continuing crop would result, but has not found this satisfactory as a whole, with the exception where the trees so treated were also supplied with water at the critical time.

Usually when trees are bearing a very heavy crop, there is a deficiency of foliage and of a growth of new wood. There was a wonderful show of blossom this year on most of the trees which bore heavily last year, but it was noticeable on close examination that the flowers were not perfectly formed and there was consequently no pollination.

In a number of orchards it is a practice to grow vegetables between the trees on portions selected as suitable; this means the use of fertilisers and also the use of water. The trees in these portions bear a crop of fruit every year. One grower used a patch of ground for some years to raise onion seedlings; there were nine apple trees in the patch, and they bore continuously. He then began to raise the onion plants elsewhere and did not water the trees and they failed to bear; last year they had a big crop and this year the crop is small.

With apple trees particularly it is necessary that they should bear the crop and form buds for the coming year, so that growing new wood and a generous foliage is a necessity for the wellbeing of the tree, if it is to mature the buds so formed. The control of the quantity of fruit on the tree and the supply of sufficient moisture seem to be necessary if regular bearing is desired.



Mr. Beaumont has suggested to several growers that they should water some of the trees as soon as the crop is off, and, if the winter rain is late, continue to irrigate them. If heavy rains come later it would do no harm, if the orchard is reasonably drained. It should tend to lengthen the growing period and thus stimulate the trees and help to mature the buds.

### VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

“M. M.,” Jamestown, has horse with a board-like swelling along one side of belly. Reply—The symptoms suggest that an abscess is in course of development or that the animal has a wound somewhere under the belly or forearm. An abscess may be caused by entrance of a thorn or splinter. For treatment, it is advised that a careful examination be made for a wound or presence of splinters, thorns, &c. Bathe the swelling for five to 10 minutes at a time three or four times a day with hot water in which a little disinfectant, such as lysol, has been added. The water should be kept at an even temperature by adding more hot water from time to time. If swelling “points,” it should be opened at lowest part with a clean, sharp penknife and then syringed out with lysol solution (one tablespoonful to one pint of water).

“E. B. P.,” Murraytown, reports gelding 14 years old passing water tinged with blood. Lips swollen and low in condition. Reply—As the passage of blood in the urine may occur in quite a number of different diseases of the urinary organs, it is impossible to diagnose the case from the particulars given. It would appear to be some chronic and probably incurable condition, and in view of the age and condition of the animal, destruction would be the best course to take. If the owner would care to subsequently send us down the animal's kidneys and bladder (preserved in weak formalin solution), we would have an examination of these organs made to try to determine for his and our information the exact nature of the trouble. The package containing the organs should be addressed to Chief Inspector of Stock, Stock and Brands Department, Adelaide, and should be accompanied by a letter advising its dispatch.

Secretary, Agricultural Bureau, Blackheath, asks:—(1) Information re hand serving ewes. (2) A reliable means of “bringing on” the ewes quickly. (3) Is there any advantage in allowing the ram to serve more than once? (4) A suitable ration for a ram. Replies—(1) The usual practice is to yard the ewes daily and turn in amongst them “teaser” rams guarded with bagging to prevent service. As the ewes in season are discovered by this means, they are caught and placed in a separate yard till all are ready for service or sufficient for the day for the stud rams are available are secured. The ram and ewe to be mated are then placed together, and when effective service is assured the ewe is branded and turned into the service paddock. (2) “Flushing” the ewe on green feed (preferably) or grain for two or three weeks prior to the desired date of breeding will bring them to the ram in briefer periods and tends to materially increase the percentage of lambs. (3) No, one service should suffice. (4) Feed what hay (fine, short oaten hay for preference) they will eat, together with a little green lucerne if available. In addition, feed daily 6ozs. to 8ozs. of mixed oats and peas with a little bran. The grain should be crushed or soaked before mixing. If any signs of scouring arise, cut out the lucerne and bran.

“Mrs. F. W. A.,” Pinnaroo, reports pigs three months old, in good condition, lost use of hindquarters. Pigs being fed on wheat, charcoal, bonemeal, pollard, and skim milk. Reply—Continue to feed on the ration you are at present using, and give each pig one teaspoonful of freshly slaked lime daily mixed in with the trough food. Also allow them to have daily exposure to sunlight and give one or two teaspoonfuls of cod liver oil per pig per day.

“G. H. H.,” Tintinara, reports cow calved five weeks ago, milking fairly well, holds head straight out, eyes have glassy appearance. Reply—From information given it is difficult to make a diagnosis. However, it is possible that the condition may be a form



of milk fever. If the cow is no better it is suggested that she be stripped out and pumped up with air as for milk fever. Further, provided the cow can drink properly, give the following drench:—Epsom salts, 1½ lbs.; ginger, four tablespoonfuls; treacle, one cupful; warm water, two pints. Subsequently give a teaspoonful of pulv. nux vomica night and morning for seven to 10 days. To give, mix with treacle and smear on back of tongue.

“E. H. R.,” Wudinna, reports pig (boar) born without a back passage. Reply—Unless surgical treatment is given the animal will before very long sicken and die. The surgical measure to be adopted depends on the exact nature of the obstruction. If the occlusion of the passage is merely due to the presence of skin over the exit of the bowel (in which case the presence of faeces or dung in the bowel can readily be felt with the fingers), all that is necessary is to incise the skin with a pair of scissors and subsequently smear the edges of the wound with a mild antiseptic ointment to prevent reunion of the cut edges. If, however, the occlusion extends more deeply and involves the hinder portion of the bowel as well, it will be necessary, after incising the skin, to introduce the oiled finger and try to break down the adhesion of the bowel wall so as to make a passage. Enemas must be used for some days subsequently to prevent the walls of the bowel from growing together again.

“L. W. C.,” Marama, reports (1) horse losing condition although receiving good feed, and (2) horse with small swelling on outside of hock. Replies—(1) *Re Horse falling away*—The animal's teeth require attention. Further, starve him for 16 to 24 hours and give him a drench of raw linseed oil, 1½ pints; turpentine, four tablespoonfuls. Subsequently, supplement his grazing by feeding on an allowance of good chaff and bran daily and give in the damped feed a tablespoonful of Fowler's solution of arsenic night and morning each day for a fortnight. (2) *Re Horse with swollen hock*—The condition is probably bog spavin. The animal should be given a dose of physic and a little one in eight red iodide of mercury blister rubbed in over swelling on inside and outside of hock joint (do not put any in front of the hock where it bends). The animal should then be turned out for two or three months' spell.

“A. J. M.,” Cherry Gardens, reports sow eating young. She was fed on potatoes, swedes, and mangolds boiled and mixed with bran and pollard. Reply—The trouble has been caused through feeding the sow on an unbalanced ration, woefully deficient in protein and minerals. To prevent this happening, the rations of pregnant sows should contain, in addition to cereals and other carbonaceous feeds, a regular, liberal allowance of skim milk or up to 10 per cent. of meat meal; also, if possible, a limited daily allowance of chopped green feed, such as lucerne, should be fed and the following mineral mixture provided:—Common salt, one part; sweet ground bonemeal, two parts. This can either be put out in a box in a handy position in the sty or run so that the sows can feed from it at will, or it can be fed mixed in with the trough feed at the rate of 1oz. per sow per day.

“C. T. A.,” Kongorong, reports death of lambs. Walk around in a circle until exhausted. Eyes inflamed, head held on one side, and the body trembles. Lung worms are also causing trouble. Reply—In the absence of further inquiry, it is impossible to state definitely the cause of the trouble, though from the particulars you supply re symptoms, it seems to be of a dietetic nature. It may be due to the ingestion of some plant, or again, it may be the outcome of some mineral deficiency in the feed. All one can suggest from present information is a change of the affected flock to fresh pastures and the supplying the animals with a lick composed of either (a) common salt and sweet ground bonemeal in equal proportions or (b) common salt, one part; ground rock phosphate, one to two parts; molasses, 10 per cent. added. *Re Lung worms*—There is as yet no really satisfactory method of treatment for these parasites. The following



preparation for intra-tracheal injection (if it can be carried out) is recommended:—Oil of turpentine, 20 drops; oil of creosote, 10 drops; chloroform, 10 drops; olive oil, one teaspoonful. This is a dose for a full grown sheep and may be decreased by one-third for lambs. The injection is given slowly, direct into the windpipe, about half way down the neck, using a hypodermic syringe. Severe coughing generally occurs after its administration. Three or four injections are necessary at daily intervals.

“E. H. P.,” Rockleigh, asks is there any method of causing a sheep to “throw up” anything harmful which it might have swallowed? Reply—There is no medicine which can be given to ruminating animals, such as sheep or cattle, which will induce vomiting. The specific antidote for arsenical poisoning is to mix liquor ferri per-chloride with carbonate of soda, dissolved in water, in the proportions of 2ozs. or 3ozs. of the former to one of the latter. The resulting precipitate should be filtered off through a piece of linen or a pocket handkerchief and given straight away as a drench mixed in warm water. It may be given *ad lib.* in repeated doses. Oil, milk, white of egg, lime water and fluid magnesia are all serviceable antidotes which can also be used.

## METTER'S “NUOIL” DOUBLE GEARED SELF-OILING WINDMILLS.

IN SIZES FROM 8ft. TO 14ft. WHEEL.

The strongest, best lubricated, best designed, and best governed.  
Pump more water on a lighter breeze.

No spring on automatic oiling system to break, and no sheet-metal oil conveyors to wear out.

Gained First Prize and Silver Medal Adelaide Show, 1922, 1923, 1924, 1925, 1926, and 1930 (no entry 1928-29).

Also Gold Medal at the All-Australian Exhibition, 1930.

A reliable and useful investment, and the popular choice of experienced pastoralists, farmers, and others.



### METTER'S 5ft. “MINOR” WINDMILLS.

Most efficient for pumping water from shallow depths.

MILL ONLY, £9 15/0; on 15ft. G.I. TOWER, £15 15/0; on 20ft. TOWER, £17 17/6.

### METTER'S FUEL STOVES AND WASHING COPPERS.

Use less fuel and retain heat longer.

WHOLLY MANUFACTURED IN SOUTH  
AUSTRALIA BY

## METTERS LIMITED,

98, 99, 100, North Terrace,  
ADELAIDE.

“NO FEAR OF A DROUGHT WITH A  
METTERS ABOUT.”



## THE BRITISH MARKET FOR AUSTRALIAN BARLEY.

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An important announcement on the marketing of Australian barley in Great Britain has been furnished to the Agent-General for South Australia by a representative of a firm of brewers operating in a large business way in London. The statement made by this gentleman—who is fully conversant with the details of the British market for Australian barley—arose from a conversation with the Agent-General on the falling off in the quality of our barley and the damage which was resulting to Australia in consequence.

The full text of the statement is as follows:—

“The total consumption in brewing is roughly 4,000,000 quarters of barley, say 800,000 tons. To this must be added a considerable quantity for distilling and also the production of foods, such as malt extract, which, however, are not material. Of this, something like one quarter, say 200,000 tons, is imported, but this varies from year to year to some extent according to price and quality. Foreign barley, however, is primarily used to correct the deficiencies of English barley, and a considerable amount would be used whatever the price. On the other hand, if it is exceedingly cheap, the consumption tends to increase.

There are two kinds of barley—the two-rowed barley such as is grown in Europe, and the six-rowed barley, the long thin type, which is grown in California, Africa, etc. There is a regular supply of barley from California, and the market is arranged on well-defined principles, and the majority of six-rowed barley comes from that district.

There is a demand for two-rowed barley from sunny climes, and this would be larger if a regular supply were obtainable. Substantial supplies of two-rowed barleys come to this country from Moravia, Czecho-Slovakia, &c. Both two-rowed and six-rowed barleys are grown in Australia, but the results have not been satisfactory owing to fluctuations of quality, irregular supplies, &c. The criticism I have heard of Australian six-rowed barleys is that they frequently contain undue proportions of nitrogen, and the growers do not seem able to control this.

A difficulty to be got over is the fact that Australia harvests its crop round about January, and it arrives in this country too late for that malting season and has to be kept several months before it can be malted. On the other hand, Californian barley is harvested round about June, and arrives here before or during the malting season.

I recently had a conversation with a man who interested himself very much in Australian barley a few years ago. His view was that it would be difficult, if not impossible, for Australia to compete with California in matters of price (of course, a preferential tariff might alter this), especially when the difficulty of the harvest season is taken into account. But he saw no reason why there should not be a large demand for Australian barley of the two-rowed chevalier type if it were properly grown from the right seed, harvested, and delivered. His experience proves that it is futile discussing any substantial business with Australia owing to the complete inability of the Australian business man to deliver up to sample. He told me that he had succeeded in selling 3,000 quarters to a noted English brewery, that he had impressed on the vendors that if it was to be the father of future orders it must be up to sample, that the agents here had shown him a cable from the vendors' agents in Australia saying that every bit was equal or superior to the sale sample, but that when the delivery arrived he was unable to find a single sack that was up to description. The brewers



# TO ENSURE RECORD CROPS



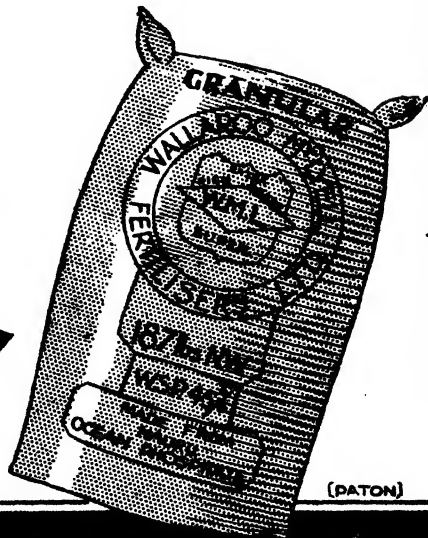
**Specify W.M.L.**

—+—+—+—  
**Heavy Crops,  
Sweeter Pastures,  
and  
Healthy Stock  
follow its liberal use.**



# W.M.L.

**EXTRA HIGH GRADE  
45% SUPER.**



(PATON)



threw up the consignment and my friend lost £3,000. I have confidence in my friend's report of this particular transaction, and the general impression on the market is something of a similar description.

The general conclusion, therefore, is this: that Australia can grow barley which will compete with Californian in quality, but that price and date of harvesting present difficulties. That Australia can produce two-rowed barley which would command a sale amongst the best brewers in this country if deliveries can be relied upon. That this would be the most promising field for Australian produce as the price paid for two-rowed barley is considerably more generous than for six-rowed and is free from the formidable competition of Californian. That the market is very much prejudiced against Australian produce owing to the difficulty of getting delivery, and that if a revival of this market is contemplated, it would be necessary first to organise proper machinery for shipment and then to convince users in this country that this machinery was adequate.

From the way my friend talked and what I have heard in other directions, some financial guarantee would be required. It may very likely be that the natural conditions make it more difficult for the Australian shipper to deliver the goods than from other countries of supply. I cannot say how this may be, but the impression here is that Australia is simply indifferent.

I have written rather bluntly, but thought it better to do so as you may take it this represents the sort of feeling amongst purchasers of barley towards the Australian produce. My opinion is that it would be quite practicable to develop a large trade if only Australia can deliver the goods, and this will be your real problem."



Mr. T. W. Rosenfeldt's (Greenock) winning crop, Centra Crop Competition, 1930.  
Sown June, 1930, with 1½ bush. Late Glucas, and Sowis. Superphosphate per acre.  
Hay cut yielded over four tons per acre.



## NINTH ANNUAL REPORT OF THE TURRETFIELD DEMONSTRATION FARM (1929-30), INCLUDING DE- TAILED ANALYSIS OF MEAN FARMING COSTS (1921-30).

[By ARTHUR J. PERKINS, Director of Agriculture.]

(Continued from page 491).

### COST OF GROWING CEREAL HAY AT TURRETFIELD.

#### (a) CEREAL HAY SOWN ON BARE FALLOW.

It should be observed here that between 1921 and 1925 Cereal Hay was Turretfield's main crop. The progressive displacement of light horses by motor cars, the electrification of the tramway system, &c., tended to render the growing of Hay for sale purposes more or less unprofitable; hence, between 1925 and the 1928-29 season, Wheat harvested for grain displaced Hay at Turretfield, no more hay being cut than was required for home consumption. The great bulk of this Hay was derived from headlands and roadways through the standing crops, and it follows that our handling costs have been heavier than those usually incurred by the normal Haygrower who is able to deal with large, continuous areas. Our costs, however, would not have been greater than those usually incurred by the average farmer, who, like us, cuts Hay for home consumption only.

In the 1929-30 season, owing to prospective low Wheat prices and the general shortage of local Hay supplies, a larger area than usual was cut for Hay at Turretfield, portion of which it was proposed to sell, although, unfortunately, the opportunity of doing so was missed.

In Table XVII, the costs incurred for growing Hay on Bare Fallow in 1929-30 have been indicated, together with corresponding mean figures for the 1922-29 and 1922-30 periods.

**IF YOU HAVE THE WHEAT  
WE HAVE THE TRUCK TO LOAD IT.**

### **CAMPBELL'S PATENT ONE-MAN ELEVATING TRUCK**

with which one man can pick up EASILY full bags of Grain, Super, Boxes, &c., wheel them to a lorry or platform, and by lifting handle of truck platform can load the lorry without any assistance. . . .

Further, you don't have to bring the bag to the lifter—nor do you have to pull the lifter with the bag to the required position. . . .

**THE BAG IS ON THE TRUCK WHEELS (15" x 2½") READY FOR WHEELING,  
AS SOON AS LIFTED,**

and the operator does not handle the bags until he gets on the lorry to stack them.

The Truck is of piping—strong—easy to operate—and will last a lifetime.

All particulars from—

**J. L. CAMPBELL & COY.,**  
147, CURRIE STREET, ADELAIDE, SOUTH AUSTRALIA.



TABLE XVII.—Analysis of Cost of Growing Cereal Hay Sown on Bare Fallow in 1929-30, together with Mean Costs of Preceding Seasons.

PART I.—Costs of 221.84 Acres—1.31 Tons per Acre.

|                                   | 1929-30. |          |             | Percentages.  |            |          |
|-----------------------------------|----------|----------|-------------|---------------|------------|----------|
|                                   | Labor.   | Horses.  | Implements. | Material, &c. | Total.     | 1929-30. |
|                                   | £ s. d.  | £ s. d.  | £ s. d.     | £ s. d.       | £ s. d.    | %        |
| Tillage of Fallows .....          | 46 12 1  | 117 7 2  | 22 16 11    | —             | 186 16 2   | 17-5     |
| Seeding Operations .....          | 14 5 3   | 35 5 4   | 7 15 4      | —             | 57 5 11    | 5-4      |
| Superphosphate .....              | 1 17 0   | 1 19 9   | 0 2 4       | 54 7 10       | 58 6 11    | 5-5      |
| Seed .....                        | 5 16 4   | 0 4 5    | 1 1 3       | 78 13 11      | 85 15 11   | 8-0      |
| Totals .....                      | 21 18 7  | 37 9 6   | 8 18 11     | 133 1 9       | 201 8 9    | 18-9     |
| Spring Tillage .....              | 2 19 5   | 3 11 8   | 1 3 2       | —             | 7 14 3     | 0-7      |
| Harvest Operations .....          | 145 18 1 | 71 6 9   | 38 7 1      | 0 11 4        | 256 3 3    | 24-1     |
| Binder Twine .....                | —        | —        | —           | 29 19 3       | 29 19 3    | 2-8      |
| Totals .....                      | 145 18 1 | 71 6 9   | 38 7 1      | 30 10 7       | 286 2 6    | 26-9     |
| Unallotted Expenditure .....      | 57 4 3   | 2 17 7   | 3 11 8      | 61 0 7        | 124 14 1   | 11-7     |
| Rates and Taxes .....             | —        | —        | —           | 7 16 0        | 7 16 0     | 0-7      |
| Rent (18 months) .....            | —        | —        | —           | 175 12 4      | 175 12 4   | 16-5     |
| Interest on Working Capital ..... | —        | —        | —           | 75 12 11      | 75 12 11   | 7-1      |
| Totals .....                      | 57 4 3   | 2 17 7   | 3 11 8      | 320 1-10      | 383 15 4   | 36-0     |
| Grand Totals .....                | 274 12 5 | 232 12 8 | 74 17 9     | 483 14 2      | 1,065 17 0 | 100-0    |
| Percentages—                      | %        | %        | %           | %             | %          | %        |
| 1929-30 .....                     | 25-8     | 21-8     | 7-0         | 45-4          |            |          |
| 1922-29 .....                     | 27-8     | 19-7     | 9-0         | 43-5          |            |          |
| 1922-30 .....                     | 27-4     | 20-2     | 8-5         | 43-9          |            |          |



TABLE XVII.—*Analysis of Cost of Growing Cereal Hay on Bare Fallow in 1929-30, together with Mean Costs of Preceding Seasons—Continued.*PART II.—*Mean Costs per Acre, 1922-30.*

|                                     | Labor. |      | Mean Costs.<br>Horses. |      | Implements. |      | Material, &c. |      | Totals.<br>1922-30. |     | 1922-29. |      |
|-------------------------------------|--------|------|------------------------|------|-------------|------|---------------|------|---------------------|-----|----------|------|
|                                     | s.     | d.   | s.                     | d.   | s.          | d.   | s.            | d.   | s.                  | d.  | s.       | d.   |
| Tillage of Fallows .....            | 3      | 11-3 | 9                      | 11-8 | 1           | 11-9 | —             | —    | 15                  | 11  | 15       | 7-1  |
| Seeding Operations.....             | 2      | 0-1  | 4                      | 0-1  | 1           | 3-5  | —             | —    | 7                   | 3-7 | 8        | 0-3  |
| Superphosphate .....                | 0      | 2-6  | 0                      | 2-8  | 0           | 0-2  | 6             | 11-0 | 7                   | 4-6 | 8        | 1-1  |
| Seed .....                          | 0      | 6-6  | 0                      | 0-1  | 0           | 0-7  | 8             | 4-6  | 9                   | 0   | 9        | 5-1  |
| Totals .....                        | 2      | 9-3  | 4                      | 3-0  | 1           | 4-4  | 15            | 3-6  | 23                  | 8-3 | 25       | 6-5  |
| Spring Tillage .....                | 0      | 1-8  | 0                      | 2-2  | 0           | 0-6  | —             | —    | 0                   | 4-6 | 0        | 3-4  |
| Harvest Operations .....            | 14     | 9-2  | 6                      | 9-2  | 5           | 2-9  | 0             | 0-1  | 26                  | 9-4 | 28       | 0-3  |
| Binder Twine .....                  | —      | —    | —                      | —    | —           | —    | 3             | 0-4  | 3                   | 0-4 | 3        | 1-8  |
| Totals .....                        | 14     | 9-2  | 6                      | 9-2  | 5           | 2-9  | 3             | 0-5  | 29                  | 9-8 | 31       | 2-1  |
| Unallotted Expenditure .....        | 7      | 5-5  | 0                      | 4-1  | 0           | 5-2  | 4             | 4-6  | 12                  | 7-4 | 13       | 1-0  |
| Rates and Taxes .....               | —      | —    | —                      | —    | —           | —    | 0             | 7-7  | 0                   | 7-7 | 0        | 7-5  |
| Rent (18 months) .....              | —      | —    | —                      | —    | —           | —    | 16            | 0-6  | 16                  | 0-6 | 16       | 1-4  |
| Interest on Working Capital.....    | —      | —    | —                      | —    | —           | —    | 7             | 3-7  | 7                   | 3-7 | 7        | 5-7  |
| Totals .....                        | 7      | 5-5  | 0                      | 4-1  | 0           | 5-2  | 28            | 4-6  | 36                  | 7-4 | 37       | 3-6  |
| Mean Grand Totals—<br>1922-30 ..... | 29     | 1-1  | 21                     | 6-3  | 9           | 1-0  | 46            | 8-7  | 106                 | 5-1 | —        | —    |
| 1922-29 .....                       | 30     | 6-6  | 21                     | 8-5  | 9           | 10-4 | 47            | 9-2  | —                   | —   | 109      | 10-7 |



TABLE XVII.—Analysis of Cost of Growing Cereal Hay on Bare Fallow in 1929-30, together with Mean Costs of Preceding Seasons—Continued.

PART III.—Mean Costs per Ton, 1922-30.

|                                  | Labor. |     | Mean Costs.<br>Horses. |     | Implements. |      | Material, &c. |      | Total Costs. |          |      |      |
|----------------------------------|--------|-----|------------------------|-----|-------------|------|---------------|------|--------------|----------|------|------|
|                                  | s.     | d.  | s.                     | d.  | s.          | d.   | s.            | d.   | 1922-30.     | 1922-29. |      |      |
| Tillage of Fallows .....         | 2      | 2-5 | 5                      | 7-0 | 1           | 1-3  | —             | 8    | 10-8         | 8        | 0-1  |      |
| Seeding Operations.....          | 1      | 1-5 | 2                      | 2-9 | 0           | 8-6  | —             | 4    | 1-0          | 4        | 1-4  |      |
| Superphosphate .....             | 0      | 1-5 | 0                      | 1-5 | 0           | 0-1  | 3             | 10-4 | 4            | 1-5      | 4    | 1-8  |
| Seed .....                       | 0      | 3-7 | 0                      | 0-1 | 0           | 0-4  | 4             | 8-2  | 5            | 0-4      | 4    | 10-1 |
| Totals .....                     | 1      | 6-7 | 2                      | 4-5 | 0           | 9-1  | 8             | 6-6  | 13           | 2-9      | 13   | 1-3  |
| Spring Tillage .....             | 0      | 1-0 | 0                      | 1-2 | 0           | 0-4  | —             | 0    | 2-6          | 0        | 1-8  |      |
| Harvest Operations .....         | 8      | 3-1 | 3                      | 9-4 | 2           | 11-2 | 0             | 0-1  | 14           | 11-8     | 14   | 4-7  |
| Binder Twine .....               | —      | —   | —                      | —   | —           | —    | 1             | 8-4  | 1            | 8-4      | 1    | 7-4  |
| Totals .....                     | 8      | 3-1 | 3                      | 9-4 | 2           | 11-2 | 1             | 8-5  | 16           | 8-2      | 16   | 0-1  |
| Unallotted Expenditure .....     | 4      | 2-0 | 0                      | 2-4 | 0           | 2-9  | 2             | 5-4  | 7            | 0-7      | 6    | 8-6  |
| Rates and Taxes .....            | —      | —   | —                      | —   | —           | —    | 0             | 4-3  | 0            | 4-3      | 0    | 3-8  |
| Rent (18 months) .....           | —      | —   | —                      | —   | —           | —    | 8             | 11-7 | 8            | 11-7     | 8    | 3-3  |
| Interest on Working Capital..... | —      | —   | —                      | —   | —           | —    | 4             | 1-1  | 4            | 1-1      | 3    | 10-1 |
| Totals .....                     | 4      | 2-0 | 0                      | 2-4 | 0           | 2-9  | 15            | 10-5 | 20           | 5-8      | 19   | 1-8  |
| Mean Grand Totals—               |        |     |                        |     |             |      |               |      |              |          |      |      |
| 1922-30 .....                    | 16     | 3-3 | 12                     | 0-5 | 5           | 0-9  | 26            | 1-6  | 59           | 6-3      | —    | —    |
| 1922-29 .....                    | 15     | 8-2 | 11                     | 1-8 | 5           | 0-8  | 24            | 6-3  | —            | —        | 56   | 5-1  |
| Mean Yields per Acre .....       | —      | —   | —                      | —   | —           | —    | —             | —    | 1-79         | —        | 1-95 | —    |



In Table XVIII. below, under Statements A, B, and C, I have contrasted in summary mean expenditure of eight successive years incurred respectively for Cereal Hay on the one hand and for Wheat on the other. In each instance crops concerned have been sown on Bare Fallow.

TABLE XVIII.—*Summarising Eight Years' Mean Expenditure Incurred for Cereal Hay in Comparison with Corresponding Mean Figures for Wheat Harvested for Grain.*

|                                                     | Cereal Hay Costs. |            |              | Wheat for Grain Costs. |             |              |
|-----------------------------------------------------|-------------------|------------|--------------|------------------------|-------------|--------------|
|                                                     | Per Acre.         | Per Ton.   | Per-centage. | Per Acre.              | Per Bushel. | Per-centage. |
| STATEMENT "A."                                      |                   |            |              |                        |             |              |
|                                                     | £ s. d.           | s. d.      |              | £ s. d.                | s. d.       |              |
| Preparation of Land .....                           | 0 15 11           | 8 11       | 14.9         | 0 19 9                 | 1 0         | 20.8         |
| Seeding Operations .....                            | 1 3 8             | 13 3       | 22.3         | 1 3 4                  | 1 2         | 24.7         |
| Harvest Operations .....                            | 1 9 10            | 16 8       | 28.0         | 0 16 9                 | 0 10        | 17.7         |
| Incidental Expenditure .....                        | 0 13 8            | 7 7        | 12.8         | 0 11 9                 | 0 8         | 12.5         |
| Interest on Working Capital ....                    | 0 7 4             | 4 1        | 6.9          | 0 7 1                  | 0 4         | 7.4          |
| Rent (18 months) .....                              | 0 16 0            | 9 0        | 15.1         | 0 16 0                 | 0 10        | 16.9         |
| Totals .....                                        | 5 6 5             | 59 6       | 100.0        | 4 14 8                 | 4 10        | 100.0        |
| STATEMENT "B."                                      |                   |            |              |                        |             |              |
|                                                     | £ s. d.           | s. d.      |              | £ s. d.                | s. d.       |              |
| Labor (direct and indirect) .....                   | 1 15 1            | 19 7       | 33.0         | 1 3 8                  | 1 3         | 25.0         |
| Use of Horses .....                                 | 0 17 5            | 9 9        | 16.3         | 0 16 6                 | 0 9         | 17.4         |
| Use of Implements .....                             | 0 7 2             | 4 0        | 6.7          | 0 6 2                  | 0 4         | 6.5          |
| Seed .....                                          | 0 8 5             | 4 8        | 7.9          | 0 8 10                 | 0 5         | 9.4          |
| Purchase of Essential Material ..                   | 0 10 0            | 5 7        | 9.4          | 0 12 4                 | 0 8         | 13.0         |
| Incidentals .....                                   | 0 5 0             | 2 10       | 4.7          | 0 4 1                  | 0 3         | 4.4          |
| Interest on Working Capital ....                    | 0 7 4             | 4 1        | 6.9          | 0 7 1                  | 0 4         | 7.4          |
| Rent (18 months) .....                              | 0 16 0            | 9 0        | 15.1         | 0 16 0                 | 0 10        | 16.9         |
| Totals .....                                        | 5 6 5             | 59 6       | 100.0        | 4 14 8                 | 4 10        | 100.0        |
| STATEMENT "C."                                      |                   |            |              |                        |             |              |
|                                                     | £ s. d.           | s. d.      |              | £ s. d.                | s. d.       |              |
| Interest on Land and Improvements                   | 0 16 0            | 9 0        | 15.1         | 0 16 0                 | 0 10        | 16.9         |
| Interest on Working Capital ....                    | 0 7 4             | 4 1        | 6.9          | 0 7 1                  | 0 4         | 7.4          |
| Depreciation on Improvements and Plant .....        | 0 9 10            | 5 6        | 9.2          | 0 9 0                  | 0 6         | 9.5          |
| Labor (exclusive of depreciation on quarters) ..... | 1 13 9            | 18 10      | 31.7         | 1 2 9                  | 1 2         | 24.1         |
| Purchase of Essential Material ...                  | 0 10 0            | 5 7        | 9.4          | 0 12 4                 | 0 8         | 13.0         |
| All other Costs .....                               | 1 9 6             | 16 6       | 27.7         | 1 7 6                  | 1 4         | 29.1         |
| Totals .....                                        | 5 6 5             | 59 6       | 100.0        | 4 14 8                 | 4 10        | 100.0        |
| Mean Yields per Acre .....                          |                   | Tons. 1.79 |              |                        | Bush. 19.46 |              |

The above statements show that, whereas over a period of eight successive years it has cost at Turretfield £4 14s. 8d. to grow and harvest a 19½ bush. crop of Wheat, corresponding expenditure over the same period for a 1½ ton crop of Hay has been at the mean rate of £5 6s. 5d. per acre. In other words, over this period of years the mean cost of growing and harvesting a Hay crop has been 11s. 9d. an acre higher than corresponding expenditure for a Wheat Crop harvested for grain. And unfortunately at the present time the plight of the Haygrower is even worse than that of the Wheatgrower. With Wheat at 2s. a bushel the loss to the grower on a 19½ bush. crop would be represented by £2 15s. 9d. per acre, whereas the loss to the Haygrower, with Hay at 20s. a ton, would, for a 1½ ton crop, be represented by £3 10s. 7d. per acre.

Harvesting Costs—binding, stoking, carting, and stacking—are mainly responsible for the higher relative costs of Haygrowing, namely, in the aggregate 29s. 10d. per



acre as against 16s. 9d. for corresponding grain harvest costs, representing an increase of 78.1 per cent. In this increase in harvesting costs Labor is the chief beneficiary, absorbing 14s. 9d. per acre for hay as against 3s. 8d. for a corresponding grain crop, or an increase of 302.3 per cent.

It is, of course, true that in Haygrowing districts farmers often seek to avoid portion of Hay harvesting costs by selling their hay in the stook, but of late not even this policy has proved altogether remunerative. I shall endeavor to set out the position from the latter viewpoint with the aid of available Turretfield data.

The costs of carting and stacking hay at Turretfield over the past eight years have been as follows:—

| Seasons.            | Hay<br>Carted and<br>Stacked. | Total Costs. |       | Costs<br>per<br>Ton. |
|---------------------|-------------------------------|--------------|-------|----------------------|
|                     | Tons.                         | £            | s. d. | s. d.                |
| 1922-23 .....       | 489-30                        | 144          | 16 8  | 5 11                 |
| 1923-24 .....       | 56-50                         | 32           | 0 9   | 11 4                 |
| 1924-25 .....       | 230-00                        | 93           | 12 6  | 8 2                  |
| 1925-26 .....       | 219-50                        | 118          | 12 11 | 10 10                |
| 1926-27 .....       | 122-50                        | 69           | 7 1   | 11 4                 |
| 1927-28 .....       | 175-00                        | 85           | 8 8   | 9 9                  |
| 1928-29 .....       | 77-00                         | 43           | 10 9  | 11 4                 |
| 1929-30 .....       | 317-00                        | 170          | 8 10  | 10 9                 |
| 1922-30 Means ..... | 210-85                        | 94           | 14 9  | 9 0                  |

From the above, it follows that the mean costs of carting and stacking Hay at Turretfield have been represented by 9s. a ton or for a 1.79 ton harvest by 16s. 1d. per acre. Hence, mean costs of growing Hay and stooking it in the field would be reduced to 50s. 6d. a ton, or 90s. 4d. an acre for a 1.79 ton harvest; that is to say, 4s. 4d. per acre less than corresponding costs for growing and harvesting a 19½bush. Wheat Crop. But even this reduced figure (£4 10s. 4d. per acre) leaves a deficit of £2 14s. 6d. per acre for a 1.79 ton crop sold at £1 a ton in the stook, and farmers are known to have accepted 15s. in the present season.

It can be admitted, however, that for a farmer with a large family, Haygrowing presents certain definite advantages over Wheatgrowing when yields and current prices can be made to balance costs of production. It has already been pointed out that a farmer harvesting a 19½bush. Wheat crop from 300 acres and balancing costs of production by sales at 4s. 10d. would have earned £355 in the way of wages for himself and family, together with adequate interest on Capital invested. Similarly, a farmer who cuts and stacks 300 acres of Cereal Hay going 1½ tons to the acre, and who is fortunate enough to balance costs by sales at 59s. 6d. per ton, would have earned £526 in the way of wages for himself and family, in addition to adequate interest on Capital invested. Hence, from this viewpoint, when receipts can be made to balance expenditure, the advantage is decidedly with the Haygrower blessed with a large family.

It is true that the costs of Production given for both Wheat and Hay are "inclusive" costs, i.e., they include not only out-of-pocket expenditure, but in addition book entries, which some may consider out of place. Reference to Statement C will show that Interest on Land and Improvements, Interest on Working Capital, and Depreciation on Improvements and Plant—all of which are mere book entries for those who are fortunate enough to be free from debt—aggregate 1s. 8d. per Bushel for Wheat and 18s. 7d. a ton for Hay. If we deduct these items which do not involve out-of-pocket expenditure for those who are free from debt our costs per unit would be reduced to 3s. 2d. per bushel for Wheat and 40s. 11d. per ton for Hay in the stack, or 31s. 11d. for Hay in the stook. But unfortunately prices offering to-day for neither Wheat nor Hay will balance these revised estimates of Costs. If, on the other hand, in addition to these deductions, we assume that the farmer's labor can go for nothing—18s. 10d. per ton



of Hay and 1s. 2d. per bushel of Wheat—our costs would finally be brought to closer approximation of present-day prices, namely, 2s. a bushel for Wheat and 22s. 1d. per ton of Hay.

*Working Hours.*—I have shown below in summary the mean number of working hours absorbed in growing and harvesting one acre of Hay in contrast with corresponding figures for Wheat:—

|                         | Hay.   |       |                      |        | Wheat. |       |                      |        |
|-------------------------|--------|-------|----------------------|--------|--------|-------|----------------------|--------|
|                         | Costs. |       | Corresponding Hours. |        | Costs. |       | Corresponding Hours. |        |
|                         | s. d.  | s. d. | Hours.               | Hours. | s. d.  | s. d. | Hours.               | Hours. |
| Direct Labor—           |        |       |                      |        |        |       |                      |        |
| Tillage of Fallows .... | 3      | 11    |                      | 2-91   | 4      | 9     |                      | 3-52   |
| Seeding Operations ...  | 2      | 9     |                      | 2-05   | 2      | 8     |                      | 1-98   |
| Spring Tillage.....     | 0      | 2     |                      | 0-11   | 0      | 1     |                      | 0-06   |
| Harvest Operations ..   | 14     | 9     |                      | 10-92  | 3      | 10    |                      | 2-85   |
| General Expenses ....   | 7      | 6     |                      | 5-52   | 6      | 10    |                      | 5-02   |
|                         |        | 29 1  |                      | 21-51  |        | 18 2  |                      | 13-43  |
| Indirect Labor .....    |        | 6 0   |                      | 4-43   |        | 5 6   |                      | 4-07   |
| Totals .....            |        | 35 1  |                      | 25-94  |        | 23 8  |                      | 17-50  |

Number of 9½-hour days ..... 2-73 days

1-84 days

It follows that, whereas at Turretfield one acre of Wheat sown on Bare Fallow has absorbed 17½ hours of labor, or 1.84 working days, the corresponding figures for one acre of Hay in the stack has been 26 hours, or 2½ working days. The heavy requirements of Hay at harvest time—10.92 hours per acre—are in striking contrast with those of Wheat—2.85 hours per acre.

(b) CEREAL HAY SOWN ON STUBBLE GROUND.

Small areas of stubble land sown to Cereals (usually Oats) are generally cut for Hay at Turretfield. Expenditure incurred in 1929-30 on 45.08 acres, giving 0.57 tons to the acre, has been analysed in Table XIX. in contrast with Means of preceding seasons.

# GRUBBING

## IS A ONE MAN JOB

FOR STUMPS LARGE OR SMALL, GREEN OR DRY, SHORT OR HEAD-HIGH. THE ENORMOUS POWER OF A

### MONKEY GRUBBER

EASILY ACCOMPLISHES THE TASK.

Removing the most stubborn obstacles cleanly, with most roots intact. Easy to handle, simple to operate, expeditious—its only need, regular oiling. The Standard equipment will clean up everything over 1½ acres from one anchorage.

Each part designed for simplicity, easy handling, and long trouble-free service.

### A TIME SAVER AND PROFIT MAKER

ADELAIDE STOCKISTS—Australasian Implement Co., Colton, Palmer & Preston, Harris Scarfe Ltd., McPhersons Pty. Ltd., South Australian Farmers' Union.

TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.





TABLE XIX.—Analysis of 1929-30 Costs of Cereal Hay on Stubble Ground in Comparison with Means of Preceding Seasons.

PART I.—Costs on 45.08 Acres, 1929-30.

|                                   | Labor.  |       | Horses. |      | Implements. |       | Material, &c. |       | Totals. |       | Percentages. |              |
|-----------------------------------|---------|-------|---------|------|-------------|-------|---------------|-------|---------|-------|--------------|--------------|
|                                   | £ s. d. |       | £ s. d. |      | £ s. d.     |       | £ s. d.       |       | £ s. d. |       | 1929-30<br>% | 1923-29<br>% |
| Preparation of Land .....         | 8       | 1 11  | 11      | 3 3  | 2           | 17 0  | —             |       | 22      | 2 2   | 14.3         | 9.3          |
| Seeding Operations .....          | 4       | 19 11 | 10      | 0 3  | 2           | 1 4   | —             |       | 17      | 1 6   | 11.0         | 7.1          |
| Superphosphate .....              | 0       | 7 11  | 0       | 8 6  | 0           | 0 6   | 11            | 13 5  | 12      | 10 4  | 8.1          | 6.3          |
| Seed .....                        | 1       | 3 6   | 0       | 0 11 | 0           | 4 4   | 15            | 18 7  | 17      | 7 4   | 11.2         | 9.9          |
| Totals .....                      | 6       | 11 4  | 10      | 9 8  | 2           | 6 2   | 27            | 12 0  | 46      | 19 2  | 30.3         | 24.7         |
| Spring Tillage .....              | 2       | 4 11  | 2       | 14 6 | 0           | 1 7   | —             |       | 5       | 1 0   | 3.2          | 1.1          |
| Harvest Operations .....          | 14      | 14 2  | 7       | 18 0 | 6           | 17 4  | 0             | 1 0   | 29      | 10 6  | 19.1         | 37.0         |
| Binder Twine .....                | —       |       | —       |      | —           |       | 2             | 13 6  | 2       | 13 6  | 1.7          | 3.4          |
| Totals .....                      | 14      | 14 2  | 7       | 18 0 | 6           | 17 4  | 2             | 14 6  | 32      | 4 0   | 20.8         | 40.4         |
| Unalotted Costs .....             | 8       | 10 6  | 0       | 8 7  | 0           | 10 9  | 9             | 1 10  | 18      | 11 8  | 12.0         | 10.2         |
| Rates and Taxes .....             | —       |       | —       |      | —           |       | 1             | 11 10 | 1       | 11 10 | 1.0          | 0.7          |
| Rent (9 months) .....             | —       |       | —       |      | —           |       | 17            | 15 6  | 17      | 15 6  | 11.5         | 9.7          |
| Interest on Working Capital ..... | —       |       | —       |      | —           |       | 10            | 12 7  | 10      | 12 7  | 6.9          | 6.6          |
| Totals .....                      | 8       | 10 6  | 0       | 8 7  | 0           | 10 9  | 39            | 1 9   | 48      | 11 7  | 31.4         | 27.2         |
| Grand Totals .....                | 40      | 2 10  | 32      | 14 0 | 12          | 12 10 | 69            | 8 3   | 154     | 17 11 | 100.0        | 100.0        |
| Percentages—                      | %       |       | %       |      | %           |       | %             |       | %       |       |              |              |
| 1929-30 .....                     | 25.9    |       | 21.1    |      | 8.2         |       | 44.8          |       |         |       |              |              |
| 1923-29 .....                     | 32.7    |       | 18.0    |      | 10.6        |       | 38.7          |       |         |       |              |              |
| 1923-30 .....                     | 31.3    |       | 18.6    |      | 10.1        |       | 40.0          |       |         |       |              |              |



TABLE XIX.—Analysis of 1929-30 Costs of Cereal Hay on Stubble Ground in Comparison with Means of Preceding Seasons.

## PART II.—Mean Costs per Acre, 1923-30.

|                                   | Labor.<br>s. d. | Horses.<br>s. d. | Implements.<br>s. d. | Material, &c.<br>s. d. | Totals.           |                   |
|-----------------------------------|-----------------|------------------|----------------------|------------------------|-------------------|-------------------|
|                                   |                 |                  |                      |                        | 1923-30.<br>s. d. | 1923-29.<br>s. d. |
| Preparation of Land .....         | 2 6-5           | 3 10-9           | 0 9-4                | —                      | 7 2-8             | 6 5-7             |
| Seeding Operations .....          | 1 7-2           | 3 1-9            | 1 4-0                | —                      | 6 1-1             | 5 7-8             |
| Superphosphate .....              | 0 2-0           | 0 2-3            | 0 0-1                | 4 10-1                 | 5 2-5             | 5 1-3             |
| Seed .....                        | 0 4-4           | 0 0-8            | 0 0-6                | 7 5-3                  | 7 11-1            | 7 11-9            |
| Totals .....                      | 2 1-6           | 3 5              | 1 4-7                | 12 3-4                 | 19 2-7            | 18 9              |
| Spring Tillage .....              | 0 5-4           | 0 7-4            | 0 1-7                | —                      | 1 2-5             | 10-8              |
| Harvest Operations .....          | 14 4-9          | 6 3-7            | 5 3-4                | 0 0-1                  | 26 0-1            | 29 9-6            |
| Binder Twine .....                | —               | —                | —                    | 2 4-2                  | 2 4-2             | 2 8-3             |
| Totals .....                      | 14 4-9          | 6 3-7            | 5 3-4                | 2 4-3                  | 28 4-3            | 32 5-9            |
| Unallotted Costs .....            | 4 10-1          | 0 2-7            | 0 3-3                | 2 10-4                 | 8 2-5             | 8 2-4             |
| Rates and Taxes .....             | —               | —                | —                    | 0 7-2                  | 0 7-2             | 0 6-9             |
| Rent (9 months) .....             | —               | —                | —                    | 7 9-8                  | 7 9-8             | 7 9-6             |
| Interest on Working Capital ..... | —               | —                | —                    | 5 1-8                  | 5 1-8             | 5 3-4             |
| Totals .....                      | 4 10-1          | 0 2-7            | 0 3-3                | 16 5-2                 | 21 9-3            | 21 10-3           |
| Mean Grand Totals—                |                 |                  |                      |                        |                   |                   |
| 1923-30 .....                     | 24 4-5          | 14 5-7           | 7 10-5               | 31 0-9                 | 77 9-6            | —                 |
| 1923-29 .....                     | 26 3-7          | 14 5-5           | 8 6-5                | 31 2-0                 | —                 | 80 5-7            |



TABLE XIX.—Analysis of 1929-30 Costs of Cereal Hay on Stubble Ground in comparison with Means of Preceding Seasons—continued.

## PART III.—Mean Costs per Ton, 1923-30.

|                                   | Labor.<br>s. d. | Horses.<br>s. d. | Implements.<br>s. d. | Material, &c.<br>s. d. | TOTALS.           |                   |
|-----------------------------------|-----------------|------------------|----------------------|------------------------|-------------------|-------------------|
|                                   |                 |                  |                      |                        | 1923-30.<br>s. d. | 1923-29.<br>s. d. |
| Preparation of Land .....         | 1 11-3          | 2 11-0           | 0 7-2                | —                      | 5 6-4             | 4 3-0             |
| Seeding Operations .....          | 1 2-7           | 2 4-9            | 1 0-3                | —                      | 4 7-9             | 3 8-6             |
| Superphosphate .....              | 0 1-5           | 0 1-7            | 0 0-1                | 3 8-5                  | 3 11-8            | 3 4-3             |
| Seed .....                        | 0 3-4           | 0 0-7            | 0 0-4                | 5 8-3                  | 6 0-8             | 5 3-0             |
| Totals .....                      | 1 7-6           | 2 7-3            | 1 0-8                | 9 4-8                  | 14 8-5            | 12 3-9            |
| Spring Tillage .....              | 0 4-1           | 0 5-7            | 0 1-3                | —                      | 0 11-1            | 0 7-1             |
| Harvest Operations .....          | 11 0-3          | 4 9-8            | 4 0-5                | —                      | 19 10-6           | 19 6-9            |
| Binder Twine .....                | —               | —                | —                    | 1 9-5                  | 1 9-5             | 1 9-2             |
| Totals .....                      | 11 0-3          | 4 9-8            | 4 0-5                | 1 9-5                  | 21 8-1            | 21 4-1            |
| Unallotted Costs .....            | 3 8-4           | 0 2-1            | 0 2-5                | 2 2-3                  | 6 3-3             | 5 4-6             |
| Rates and Taxes .....             | —               | —                | —                    | 0 5-5                  | 0 5-5             | 0 4-5             |
| Rent (9 months) .....             | —               | —                | —                    | 5 11-8                 | 5 11-8            | 5 1-5             |
| Interest on Working Capital ..... | —               | —                | —                    | 3 11-3                 | 3 11-3            | 3 5-5             |
| Totals .....                      | 3 8-4           | 0 2-1            | 0 2-5                | 12 6-9                 | 16 7-9            | 14 4-1            |
| Mean Grand Totals—                |                 |                  |                      |                        |                   |                   |
| 1923-30 .....                     | 18 7-7          | 11 0-8           | 6 0-3                | 23 9-2                 | 59 6-0            | —                 |
| 1923-29 .....                     | 17 3-3          | 9 6-0            | 5 7-4                | 20 5-5                 | —                 | 52 10-2           |
| Mean Yields per Acre .....        | —               | —                | —                    | —                      | Tons<br>1-31      | Tons.<br>1-52     |



Costs of growing Hay on Cereal Stubbles as indicated in Table XIX. naturally challenge comparison with corresponding costs for Hay grown on Bare Fallow. Comparative results for seven and eight seasons respectively have been shown below in Table XX.:—

TABLE XX.—*Contrasting Mean Costs of Cereal Hay sown on Stubble Land, 1923-30, with Corresponding Costs for Cereal Hay sown on Bare Fallow, 1922-30.*

|                                                        | Stubble Hay, 1923-30. |          |             | Bare Fallow Hay, 1922-30. |          |             |
|--------------------------------------------------------|-----------------------|----------|-------------|---------------------------|----------|-------------|
|                                                        | Per Acre.             | Per Ton. | Percentage. | Per Acre.                 | Per Ton. | Percentage. |
| STATEMENT A.                                           |                       |          |             |                           |          |             |
|                                                        | £ s. d.               | s. d.    | %           | £ s. d.                   | s. d.    | %           |
| Preparation of Land .....                              | 0 7 3                 | 5 6      | 9.3         | 0 15 11                   | 8 11     | 14.9        |
| Seeding Operations .....                               | 0 19 3                | 14 9     | 24.7        | 1 3 8                     | 13 3     | 22.3        |
| Harvest Operations .....                               | 1 8 4                 | 21 8     | 36.4        | 1 9 10                    | 16 8     | 28.0        |
| Incidental Costs .....                                 | 0 10 0                | 7 8      | 13.0        | 0 13 8                    | 7 7      | 12.8        |
| Interest on Working Capital .....                      | 0 5 2                 | 3 11     | 6.6         | 0 7 4                     | 4 1      | 6.9         |
| Rent (9 or 18 months) ....                             | 0 7 10                | 6 0      | 10.0        | 0 16 0                    | 9 0      | 15.1        |
| Totals.....                                            | 3 17 10               | 59 6     | 100.0       | 5 6 5                     | 59 6     | 100.0       |
| STATEMENT B.                                           |                       |          |             |                           |          |             |
|                                                        | £ s. d.               | s. d.    | %           | £ s. d.                   | s. d.    | %           |
| Labor (direct and indirect).                           | 1 8 9                 | 22 0     | 37.0        | 1 15 1                    | 19 7     | 33.0        |
| Use of Horses .....                                    | 0 11 9                | 9 0      | 15.1        | 0 17 5                    | 9 9      | 16.3        |
| Use of Implements .....                                | 0 6 3                 | 4 9      | 8.0         | 0 7 2                     | 4 0      | 6.7         |
| Seed .....                                             | 0 7 5                 | 5 8      | 9.6         | 0 8 5                     | 4 8      | 7.9         |
| Purchase of Essential                                  |                       |          |             |                           |          |             |
| Material .....                                         | 0 7 2                 | 5 6      | 9.2         | 0 10 0                    | 5 7      | 9.4         |
| Incidentals .....                                      | 0 3 6                 | 2 8      | 4.5         | 0 5 0                     | 2 10     | 4.7         |
| Interest on Working Capital .....                      | 0 5 2                 | 3 11     | 6.6         | 0 7 4                     | 4 1      | 6.9         |
| Rent (9 or 18 months) ....                             | 0 7 10                | 6 0      | 10.0        | 0 16 0                    | 9 0      | 15.1        |
| Totals.....                                            | 3 17 10               | 59 6     | 100.0       | 5 6 5                     | 59 6     | 100.0       |
| STATEMENT C.                                           |                       |          |             |                           |          |             |
|                                                        | £ s. d.               | s. d.    | %           | £ s. d.                   | s. d.    | %           |
| Interest on Land and Improvements .....                | 0 7 10                | 6 0      | 10.0        | 0 16 0                    | 9 0      | 15.1        |
| Interest on Working Capital .....                      | 0 5 2                 | 3 11     | 6.6         | 0 7 4                     | 4 1      | 6.9         |
| Depreciation on Improvements and Plant .....           | 0 7 6                 | 5 9      | 9.7         | 0 9 10                    | 5 6      | 9.2         |
| Labor (exclusive of depreciation on living quarters) . | 1 7 8                 | 21 2     | 35.6        | 1 13 9                    | 18 10    | 31.7        |
| Purchase of Essential                                  |                       |          |             |                           |          |             |
| Material .....                                         | 0 7 2                 | 5 6      | 9.2         | 0 10 0                    | 5 7      | 9.4         |
| All other Costs .....                                  | 1 2 6                 | 17 2     | 28.9        | 1 9 6                     | 16 6     | 27.7        |
| Totals.....                                            | 3 17 10               | 59 6     | 100.0       | 5 6 5                     | 59 6     | 100.0       |
| Mean Yields per Acre .....                             | Tons.<br>1.31         |          |             | Tons.<br>1.79             |          |             |

The position, therefore, is that, whilst the mean costs of Cereal Hay grown on Stubble Land were £3 17s. 10d. per acre, corresponding mean costs of Cereal Hay grown on Bare Fallow were £5 6s. 5d. per acre; on the other, mean costs per ton were exactly the same, namely, 59s. 6d. This is to be accounted for by the fact that the mean yield of Hay grown on Bare Fallow was about one-half a ton better than that of Hay grown on Stubbles. The above statements show that the main increases in costs of Bare Fallow Hay arise from more costly tillage operations and 18 months' rent instead of nine, representing in the aggregate 31s. 11d. per acre as against 15s. 1d. for Stubble Hay. Seeding and harvesting operations were also slightly more costly on a per acre basis, but less so on a per ton basis.



*Working Hours.*—I have shown below the mean relative number of hours absorbed by Stubble Hay and Bare Fallow Hay respectively:—

|                       | Stubble Hay. |       |                      |        | Bare Fallow Hay. |       |                      |        |
|-----------------------|--------------|-------|----------------------|--------|------------------|-------|----------------------|--------|
|                       | Costs.       |       | Corresponding Hours. |        | Costs.           |       | Corresponding Hours. |        |
|                       | s. d.        | s. d. | Hours.               | Hours. | s. d.            | s. d. | Hours.               | Hours. |
| Direct Labor—         |              |       |                      |        |                  |       |                      |        |
| Tillage of Fallows .. | 2            | 7     | —                    | 1·88   | —                | 3     | 11                   | —      |
| Seeding Operations .  | 2            | 2     | —                    | 1·58   | —                | 2     | 9                    | —      |
| Spring Tillage .....  | 0            | 5     | —                    | 0·33   | —                | 0     | 2                    | —      |
| Harvest Operations    | 14           | 5     | —                    | 10·65  | —                | 14    | 9                    | —      |
| General Expenses...   | 4            | 10    | —                    | 3·58   | —                | 7     | 6                    | —      |
|                       |              | 24    | 5                    | 18·02  |                  | 29    | 1                    | 21·51  |
| Indirect Labor .....  | —            | 4     | 4                    | 3·24   | —                | 6     | 0                    | 4·43   |
| Totals.....           | —            | 28    | 9                    | 21·26  | —                | 35    | 1                    | *25·94 |

Number of 9½-hour days      2·24 days per acre.

2·73 days per acre.

In the matter of Labor, therefore, the difference between Stubble Hay and Bare Fallow Hay has been represented by half a working day per acre only.

#### OATS AND BARLEY AS STUBBLE CROPS.

Neither Oats nor Barley have been harvested for grain at Turretfield since 1926-27 season; hence, costs of production indicated in the 1926-27 Report must stand for the present. I have indicated in Table XXI. mean figures for both Oats and Barley under summarised Statements A, B, and C. For closer details I must refer those interested to earlier reports.

TABLE XXI.—*Contrasting Mean Costs of Growing Oats and Barley respectively as Stubble Crops at Turretfield.*

|                             | Oats.     |           |             | Barley.   |           |             |
|-----------------------------|-----------|-----------|-------------|-----------|-----------|-------------|
|                             | Per Acre. | Per Bush. | Percentage. | Per Acre. | Per Bush. | Percentage. |
|                             | £ s. d.   | s. d.     | %           | £ s. d.   | s. d.     | %           |
| STATEMENT A.                |           |           |             |           |           |             |
| Preparation of Land .....   | 0 5 3     | 0 3       | 9·5         | 0 9 1     | 0 6       | 17·5        |
| Seeding Operations .....    | 0 16 5    | 0 9       | 29·7        | 0 13 4    | 0 9       | 25·5        |
| Harvest Operations .....    | 0 15 7    | 0 9       | 28·2        | 0 12 2    | 0 9       | 23·4        |
| Incidental Costs .....      | 0 6 7     | 0 4       | 11·9        | 0 6 3     | 0 4       | 12·0        |
| Interest on Working Capital | 0 3 8     | 0 2       | 6·6         | 0 3 2     | 0 2       | 6·1         |
| Rent (9 months).....        | 0 7 10    | 0 4       | 14·1        | 0 8 1     | 0 6       | 15·5        |
| Totals.....                 | 2 15 4    | 2 7       | 100·0       | 2 12 1    | 3 0       | 100·0       |

|                              |        |     |       |         |      |       |
|------------------------------|--------|-----|-------|---------|------|-------|
| STATEMENT B.                 |        |     |       |         |      |       |
| Labor (direct and indirect). | 0 15 4 | 0 9 | 27·7  | 0 14 11 | 0 10 | 28·7  |
| Use of Horses .....          | 0 7 9  | 0 4 | 14·0  | 0 9 6   | 0 7  | 18·2  |
| Use of Implements .....      | 0 6 2  | 0 4 | 11·2  | 0 4 2   | 0 3  | 8·0   |
| Seed .....                   | 0 6 5  | 0 4 | 11·6  | 0 3 11  | 0 3  | 7·5   |
| Purchase of Essential        |        |     |       |         |      |       |
| Material .....               | 0 6 0  | 0 3 | 10·9  | 0 6 5   | 0 5  | 12·3  |
| Incidentals .....            | 0 2 2  | 0 1 | 3·9   | 0 1 11  | 0 1  | 3·7   |
| Interest on Working Capital  | 0 3 8  | 0 2 | 6·6   | 0 3 2   | 0 2  | 6·1   |
| Rent (9 months).....         | 0 7 10 | 0 4 | 14·1  | 0 8 1   | 0 5  | 15·5  |
| Totals.....                  | 2 15 4 | 2 7 | 100·0 | 2 12 1  | 3 0  | 100·0 |



TABLE XXI.—*Contrasting Mean Costs of Growing Oats and Barley respectively as Stubble Crops at Turretfield—continued.*

|                                                        | Oats.                |                    |                  | Barley.              |                    |                  |
|--------------------------------------------------------|----------------------|--------------------|------------------|----------------------|--------------------|------------------|
|                                                        | Per Acre.<br>£ s. d. | Per Bush.<br>s. d. | Percentage.<br>% | Per Acre.<br>£ s. d. | Per Bush.<br>s. d. | Percentage.<br>% |
| STATEMENT C.                                           |                      |                    |                  |                      |                    |                  |
| Interest on Land and Improvements .....                | 0 7 10               | 0 4                | 14.1             | 0 8 1                | 0 5                | 15.5             |
| Interest on Working Capital .....                      | 0 3 8                | 0 2                | 6.6              | 0 3 2                | 0 2                | 6.1              |
| Depreciation on Improvements and Plant .....           | 0 7 8                | 0 4                | 13.8             | 0 5 10               | 0 4                | 11.2             |
| Labor (exclusive of Depreciation on living quarters) . | 0 14 9               | 0 8                | 26.7             | 0 14 4               | 0 9                | 27.5             |
| Purchase of Essential Material .....                   | 0 6 0                | 0 3                | 10.9             | 0 6 5                | 0 5                | 12.3             |
| All other Costs .....                                  | 0 15 5               | 0 10               | 27.9             | 0 14 3               | 0 11               | 27.4             |
| Totals .....                                           | 2 15 4               | 2 7                | 100.0            | 2 12 1               | 3 0                | 100.0            |

Main Yields per Acre .....

21.22bush.

17.26bush.

*Working Hours.*—Mean Working Hours per acre for Oats and Barley respectively, sown on Stubble land, have been summarised below as follows:—

|                        | Oats.  |       |                      |        | Barley. |       |                      |        |
|------------------------|--------|-------|----------------------|--------|---------|-------|----------------------|--------|
|                        | Costs. |       | Corresponding Hours. |        | Costs.  |       | Corresponding Hours. |        |
|                        | s. d.  | s. d. | Hours.               | Hours. | s. d.   | s. d. | Hours.               | Hours. |
| Direct Labor—          |        |       |                      |        |         |       |                      |        |
| Preparation of Land    | 1 5    | —     | 1.05                 | —      | 2 3     | —     | 1.65                 | —      |
| Seeding Operations ... | 2 1    | —     | 1.55                 | —      | 1 5     | —     | 1.06                 | —      |
| Spring Tillage .....   | 0 1    | —     | 0.03                 | —      | 0 1     | —     | 0.08                 | —      |
| Harvest Operations     | 4 5    | —     | 3.29                 | —      | 4 2     | —     | 3.05                 | —      |
| General Expenses...    | 3 11   | —     | 2.92                 | —      | 3 6     | —     | 2.61                 | —      |
|                        | —      | 11 11 | —                    | 8.84   | —       | 11 5  | —                    | 8.45   |
| Indirect Labor .....   | —      | 3 5   | —                    | 2.50   | —       | 3 6   | —                    | 2.58   |
| Totals .....           | —      | 15 4  | —                    | 11.34  | —       | 14 11 | —                    | 11.03  |

Mean Number of 9½-hour days

1.19 days per acre.

1.16 days per acre.

#### FIELD PEASE GROWN ON STUBBLE LAND AS A FALLOW CROP PRECEDING WHEAT OR HAY.

Within recent years Field Pease have been grown fairly extensively in the Central and Lower North Divisions of the State as a fallow crop immediately preceding Wheat. At Turretfield this practice has been under observation since the 1924-25 season. Unfortunately, a regular succession of unfavorable seasons, coupled with attacks of caterpillars, have hitherto militated against favorable, or even normal, results. Mean yields hitherto secured have been indicated below:—

|                     | Areas Harvested.<br>Acres. | Mean Yields<br>per Acre.<br>Bushels. |
|---------------------|----------------------------|--------------------------------------|
| 1924-25 .....       | 28.40                      | 23.57                                |
| 1925-26 .....       | 37.18                      | 6.42                                 |
| 1926-27 .....       | 35.08                      | 23.92                                |
| 1927-28 .....       | 5.00                       | 3.00                                 |
| 1928-29 .....       | 27.47                      | 3.45                                 |
| 1929-30 .....       | 9.50                       | 3.16                                 |
| 1924-30 Means ..... | 23.77                      | 13.23                                |

It will be observed that over a period of six successive seasons the mean yield per acre has been 13½bush. only, whereas, in normal seasons, 20bush. would be considered a reasonable yield per acre.

In Table XXII. I have summarised 1929-30 Expenditure incurred for Pease in comparison with Mean Costs of preceding seasons.



TABLE XXII.—Summarising Expenditure Incurred for Pease in 1929-30 in Comparison with Means of Preceding Seasons.

## PART I.—Expenditure on 9½ Acres, 1929-30.

|                                   | Labor.  |        | Horses. |   | Implements. |   | Material, &c. |   | Totals.  |       | Percentages. |          |
|-----------------------------------|---------|--------|---------|---|-------------|---|---------------|---|----------|-------|--------------|----------|
|                                   | £ s. d. | %      | £ s. d. | % | £ s. d.     | % | £ s. d.       | % | £ s. d.  | %     | 1924-29.     | 1924-30. |
| Preparation of Land .....         | 1 15 2  | 3 1 9  | 0 9 1   | — | —           | — | —             | — | 5 6 0    | 19-0  | 11-8         | 12-2     |
| Seeding Operations .....          | 0 13 5  | 1 14 9 | 0 7 9   | — | —           | — | —             | — | 2 15 11  | 10-0  | 10-1         | 10-1     |
| Superphosphate .....              | 0 1 6   | 0 1 7  | 0 0 1   | — | —           | — | 2 4 5         | — | 2 7 7    | 8-5   | 7-7          | 7-7      |
| Seed .....                        | 0 5 4   | 0 0 4  | 0 0 11  | — | —           | — | 4 10 1        | — | 4 16 8   | 17-3  | 18-2         | 18-2     |
| Totals .....                      | 1 0 3   | 1 16 8 | 0 8 9   | — | —           | — | 6 14 6        | — | 10 0 2   | 35-8  | 36-0         | 36-0     |
| Spring Tillage .....              | 0 6 11  | 0 8 0  | 0 0 1   | — | —           | — | —             | — | 0 15 0   | 2-7   | —            | 0-1      |
| Harvest Operations .....          | 0 18 3  | 1 7 5  | 1 2 0   | — | —           | — | —             | — | 3 7 8    | 12-1  | 20-5         | 20-1     |
| Bags .....                        | —       | —      | —       | — | —           | — | 0 2 8         | — | 0 2 8    | 0-5   | 3-3          | 3-1      |
| Sewing Twine .....                | —       | —      | —       | — | —           | — | 0 0 3         | — | 0 0 3    | —     | 0-1          | 0-1      |
| Totals .....                      | 0 18 3  | 1 7 5  | 1 2 0   | — | —           | — | 0 2 11        | — | 3 10 7   | 12-6  | 23-9         | 23-3     |
| Unallotted Costs .....            | 1 15 6  | 0 1 9  | 0 2 3   | — | —           | — | 1 17 11       | — | 3 17 5   | 13-8  | 10-9         | 11-1     |
| Rates and Taxes .....             | —       | —      | —       | — | —           | — | 0 3 10        | — | 0 3 10   | 0-7   | 0-8          | 0-7      |
| Rent (nine months) .....          | —       | —      | —       | — | —           | — | 2 1 10        | — | 2 1 10   | 7-5   | 9-5          | 9-5      |
| Interest on Working Capital ..... | —       | —      | —       | — | —           | — | 2 4 0         | — | 2 4 0    | 7-9   | 7-1          | 7-1      |
| Totals .....                      | 1 15 6  | 0 1 9  | 0 2 3   | — | —           | — | 6 7 7         | — | 8 7 1    | 29-9  | 28-3         | 28-4     |
| Grand Totals .....                | 5 16 1  | 6 15 7 | 2 2 2   | — | —           | — | 13 5 0        | — | 27 18 10 | 100-0 | 100-0        | 100-0    |
| Percentages—                      |         |        |         |   |             |   |               |   |          |       |              |          |
| 1929-30 .....                     | %       | %      | %       | % | %           | % | %             | % | %        | %     | %            | %        |
| 1924-29 .....                     | 20-8    | 24-3   | 7-5     | — | —           | — | 47-4          | — | —        | —     | —            | —        |
| 1924-30 .....                     | 19-6    | 20-3   | 12-5    | — | —           | — | 47-6          | — | —        | —     | —            | —        |
| 1924-30 .....                     | 19-6    | 20-6   | 12-2    | — | —           | — | 47-6          | — | —        | —     | —            | —        |







TABLE XXII.—*Summarising Expenditure Incurred for Pease in comparison with Means of Preceding Seasons—continued.*PART III.—*Mean Costs per Bushel, 1924-30.*

|                                  | Labor. |     | Horses. |     | Implements. |     | Material, &c. |       | Totals.  |          |
|----------------------------------|--------|-----|---------|-----|-------------|-----|---------------|-------|----------|----------|
|                                  | s.     | d.  | s.      | d.  | s.          | d.  | s.            | d.    | 1924-30. | 1924-29. |
| Preparation of Land .....        | 0      | 2-2 | 0       | 5-7 | 0           | 1-0 | —             | —     | 0 8-9    | 0 8-3    |
| Seeding Operations.....          | 0      | 2-2 | 0       | 3-8 | 0           | 1-3 | —             | —     | 0 7-3    | 0 7-1    |
| Superphosphate .....             | 0      | 0-2 | 0       | 0-2 | —           | —   | 0 5-2         | 0 5-6 | 0 5-4    | 0 5-4    |
| Seed .....                       | 0      | 0-6 | 0       | 0-1 | 0           | 0-1 | 1 0-4         | 1 1-2 | 1 1-2    | 1 0-8    |
| Totals .....                     | 0      | 3   | 0       | 4-1 | 0           | 1-4 | 1 5-6         | 2 2-1 | 2 2-1    | 2 1-3    |
| Spring Tillage.....              | —      | —   | 0       | 0-1 | —           | —   | —             | 0 0-1 | —        | —        |
| Harvest Operations .....         | 0      | 3-6 | 0       | 4-8 | 0           | 6-1 | —             | 1 2-5 | 1 2-5    | 1 2-4    |
| Bags .....                       | 0      | 0-4 | —       | —   | —           | —   | 0 1-9         | 0 2-3 | 0 2-3    | 0 2-3    |
| Sewing Twine .....               | —      | —   | —       | —   | —           | —   | 0 0-1         | 0 0-1 | 0 0-1    | 0 0-1    |
| Totals .....                     | 0      | 4   | 0       | 4-8 | 0           | 6-1 | 0 2           | 1 4-9 | 1 4-9    | 1 4-8    |
| Unallotted Costs .....           | 0      | 5-0 | 0       | 0-2 | 0           | 0-4 | 0 2-4         | 0 8   | 0 8      | 0 7-6    |
| Rates and Taxes .....            | —      | —   | —       | —   | —           | —   | 0 0-5         | 0 0-5 | 0 0-5    | 0 0-5    |
| Rent (nine months) .....         | —      | —   | —       | —   | —           | —   | 0 6-9         | 0 6-9 | 0 6-7    | 0 6-7    |
| Interest on Working Capital..... | —      | —   | —       | —   | —           | —   | 0 5-2         | 0 5-2 | 0 5-2    | 0 5-0    |
| Totals .....                     | 0      | 5-0 | 0       | 0-2 | 0           | 0-4 | 1 3           | 1 8-6 | 1 8-6    | 1 7-8    |
| Grand Totals—                    |        |     |         |     |             |     |               |       |          |          |
| 1924-30 .....                    | 1      | 2-2 | 1       | 2-9 | 0           | 8-9 | 2 10-6        | 6 0-6 | 6 0-6    | —        |
| 1924-29 .....                    | 1      | 1-7 | 1       | 2-3 | 0           | 8-8 | 2 9-4         | —     | —        | 5 10-2   |
| Mean Yields per Acre .....       |        |     |         |     |             |     |               | Bush. | Bush.    | Bush.    |
|                                  |        |     |         |     |             |     |               | 13-23 | 13-23    | 13-95    |



Unfortunately, like the two preceding seasons, 1929-30 was exceedingly unfavorable to Pease, and yields and costs secured since 1924 give a clear illustration of the unprofitableness of low mean yields per acre. The following statement will serve to illustrate the position:—

|                     | Mean Yields<br>per Acre.<br>Bushels. | Mean Costs. |             |
|---------------------|--------------------------------------|-------------|-------------|
|                     |                                      | Per Acre.   | Per Bushel. |
|                     |                                      | £ s. d.     | s. d.       |
| 1924-25 .....       | 23-57                                | 3 9 10      | 3 0         |
| 1925-26 .....       | 6-42                                 | 3 7 0       | 10 5        |
| 1926-27 .....       | 23-92                                | 5 10 6      | 4 7         |
| 1927-28 .....       | 3-00                                 | 3 11 2      | 23 9        |
| 1928-29 .....       | 3-45                                 | 3 13 9      | 21 4        |
| 1929-30 .....       | 3-16                                 | 2 18 10     | 18 8        |
| 1924-30 Means ..... | 13-23                                | 4 0 0       | 6 1         |

Mean Costs of Production of Field Pease at Turretfield over six consecutive seasons have been summarised below in Table XXIII. under the usual Statements A, B, and C.

TABLE XXIII.—*Summarising 1924-30 Costs of Production of Field Pease.*

|                                                            | Per Acre. | Mean Costs. | Percentage. |
|------------------------------------------------------------|-----------|-------------|-------------|
|                                                            | £ s. d.   | Per Bushel. | %           |
| STATEMENT A.                                               |           |             |             |
| Preparation of the Land .....                              | 0 9 9     | 0 9         | 12.2        |
| Seeding Operations .....                                   | 1 8 10    | 2 2         | 36.0        |
| Harvest Operations .....                                   | 0 18 8    | 1 5         | 23.3        |
| Incidental Expenditure .....                               | 0 9 6     | 0 9         | 11.9        |
| Interest on Working Capital .....                          | 0 5 8     | 0 5         | 7.1         |
| Rent (9 months).....                                       | 0 7 7     | 0 7         | 9.5         |
| Totals.....                                                | 4 0 0     | 6 1         | 100.0       |
| STATEMENT B.                                               |           |             |             |
| Labor (direct and indirect).....                           | 1 1 0     | 1 7         | 26.2        |
| Use of Horses .....                                        | 0 13 4    | 1 0         | 16.7        |
| Use of Implements .....                                    | 0 7 7     | 0 7         | 9.5         |
| Seed .....                                                 | 0 13 8    | 1 1         | 17.1        |
| Purchase of Essential Material .....                       | 0 7 11    | 0 7         | 9.9         |
| Incidentals .....                                          | 0 3 3     | 0 3         | 4.0         |
| Interest on Working Capital .....                          | 0 5 8     | 0 5         | 7.1         |
| Rent (9 months).....                                       | 0 7 7     | 0 7         | 9.5         |
| Totals.....                                                | 4 0 0     | 6 1         | 100.0       |
| STATEMENT C.                                               |           |             |             |
| Interest on Land and Improvements ...                      | 0 7 7     | 0 7         | 9.5         |
| Interest on Working Capital .....                          | 0 5 8     | 0 5         | 7.1         |
| Depreciation on Improvements and Plant                     | 0 9 7     | 0 9         | 12.0        |
| Labor (exclusive of Depreciation on Living Quarters) ..... | 1 0 2     | 1 6         | 25.2        |
| Purchase of Essential Material .....                       | 0 7 11    | 0 7         | 9.9         |
| All other Costs .....                                      | 1 9 1     | 2 3         | 36.3        |
| Totals.....                                                | 4 0 0     | 6 1         | 100.0       |

In last year's Report I was able to show on mean results of five successive seasons that the Pease-Wheat rotation had returned an excess of 15s. 11d. per acre above corresponding returns from the Bare Fallow-Wheat rotation. I was able at the time to assume prices of 5s. per bushel for Wheat and 6s. for Pease\*. To-day, with all prices

\* See *Journal of Agriculture*, December, 1929, page 409.



abnormally low, the comparison is no longer possible. On the farm Wheat is not worth more than 2s. a bushel and Pease 3s. 6d. On this basis the Pease-Wheat rotation closes on a Loss of £3 9s. 4d. per acre and the Bare Fallow-Wheat on a Loss of £2 15s. 9d. Obviously, we must await a return of more normal conditions for further discussion of this aspect of the question.

*Working Hours.*—Working hours per acre under Crop have already been indicated for other crops. Corresponding mean figures for Field Pease are indicated below in Table XXIV. in association with corresponding figures for Wheat following Pease:—

TABLE XXIV.—*Summarising Working Hours per Acre for Field Pease in Association with Corresponding Figures for the Succeeding Wheat Crop.*

|                                                                | Field Pease.        |       |               |        | Wheat Following Pease. |       |               |        |
|----------------------------------------------------------------|---------------------|-------|---------------|--------|------------------------|-------|---------------|--------|
|                                                                | Costs at 1s. 4-23d. |       | Corresponding |        | Costs at 1s. 4-23d.    |       | Corresponding |        |
|                                                                | s. d.               | s. d. | Hours.        | Hours. | s. d.                  | s. d. | Hours.        | Hours. |
| Direct Labor—                                                  |                     |       |               |        |                        |       |               |        |
| Preparation of Land                                            | 2                   | 5     | —             | 1·78   | —                      | 2     | 10            | —      |
| Seeding Operations ...                                         | 3                   | 4     | —             | 2·48   | —                      | 2     | 6             | —      |
| Spring Tillage .....                                           | 0                   | 1     | —             | 0·04   | —                      | 0     | 1             | —      |
| Harvest Operations ..                                          | 4                   | 4     | —             | 3·21   | —                      | 3     | 9             | —      |
| General Expenses.....                                          | 5                   | 6     | —             | 4·10   | —                      | 4     | 6             | —      |
|                                                                |                     | 15    | 8             | 11·61  |                        | 13    | 8             | 10·12  |
| Indirect Labor .....                                           | —                   | 5     | 4             | 3·92   | —                      | 3     | 10            | 2·82   |
| Total inclusive Labor .                                        | —                   | 21    | 0             | 15·53  | —                      | 17    | 6             | 12·94  |
| Corresponding number<br>of 9½-hour days per<br>100 acres ..... |                     |       | 163 days.     |        |                        |       | 136 days.     |        |

It will be observed from the above that the Pease-Wheat rotation offers greater scope for useful occupation of family labor than the Bare Fallow-Wheat rotation. On the basis of 100 acres Bare Fallow and 100 acres Wheat, the Bare Fallow-Wheat rotation should provide for 184 days of Labor, or a Labor Income of £118 6s. 8d., assuming receipts to balance inclusive expenditure. On the basis of 100 acres of Pease and 100 acres of Wheat sown on Pea Stubbles, the Pease-Wheat rotation should, on the other hand, make provision for 299 days of Labor, representing a Labor Income of £192 10s., always provided that receipts balanced inclusive expenditure.

Pease, moreover, present the advantage of a relatively short growing period, being sown later than Wheat and harvested earlier, and it follows that from the standpoint of the distribution of Farm Labor over the year they adapt themselves well to regular rotation with Wheat.

#### MINIMUM PRICES PER UNIT AT WHICH AGRICULTURAL PRODUCE CAN BE SOLD UNDER TURRETFIELD CONDITIONS AND LEAVE A PROFIT TO THE GROWER.

It is clear that the minimum prices at which growers in a large State like South Australia are in a position to dispose of their produce without loss cannot be determined definitely from the experiences of a single farm in the State. Hence, it must be understood that figures given below can apply to those farms only that are working under economic, climatic, and soil conditions approximating those of Turretfield. In this connection, four factors may be taken to be of major importance in affecting costs and possible minimum prices leaving a margin of profit, namely:—

- (1) Mean yields per acre; the latter are influenced chiefly by rainfall conditions, soil fertility, and management;
- (2) Land values;
- (3) Mechanical character of the soil, which, according to circumstances, renders tillage operations more or less costly; and
- (4) General ability of the farmer to work his farm at a minimum cost.



I have mentioned these points in order to stress the fact that minimum prices which farmers can afford to accept are not necessarily uniform throughout the State, but must vary from district to district and even from farm to farm. Minimum prices indicated below are derived from Turretfield results extending over eight successive seasons:—

TABLE XXV.—*Summarising what Appear to be Reasonable Prices for Agricultural Produce at Turretfield and on Farms Similarly Situated.*

|                          | Number of Seasons Concerned in Calculations. | Mean Yield per Acre. | Mean Costs of Production. |          | Prices per Bushel or per Ton, Leaving a 10 per cent. Profit to Growers. |
|--------------------------|----------------------------------------------|----------------------|---------------------------|----------|-------------------------------------------------------------------------|
|                          |                                              |                      | Per Acre.                 | Per Ton. |                                                                         |
|                          |                                              | Bushels.             | £ s. d.                   | s. d.    | s. d.                                                                   |
| Wheat (on farm) .....    | 8                                            | 19.46                | 4 14 8                    | 4 10     | 5 4                                                                     |
| Pease (on farm) .....    | 6                                            | 13.23                | 4 0 0                     | 6 1      | 6 8                                                                     |
| Barley (on farm) .....   | 5                                            | 17.26                | 2 12 1                    | 3 0      | 3 4                                                                     |
| Oats (on farm) .....     | 2                                            | 21.22                | 2 15 4                    | 2 7      | 2 10                                                                    |
|                          |                                              | Tons.                |                           |          |                                                                         |
| Hay (in the stook) ..... | 8                                            | 1.79                 | 4 10 4                    | 50 6     | 55 7                                                                    |
| Hay (in the stack) ..... | 8                                            | 1.79                 | 5 6 5                     | 59 6     | 65 5                                                                    |

Figures given in the fourth column of Table XXV. would, if and when realised for saleable produce concerned, remunerate the farmer and his family for Labor performed at the standard rate of Wages, and in addition would make adequate provision for depreciation and interest on Capital invested, provided that the farmer secured mean yields corresponding to those shown in the second column of the Table, but these prices would leave no room for Net Profits. On the other hand, should the farmer be fortunate enough to realise prices shown in the last column of the Table, he would—over and above the benefits already indicated—secure a Net Profit equivalent to 10 per cent. on his Harvest turnover. It remains to be said that the mean yields in excess of those shown in the second column of the Table would, at prices indicated, imply proportionally higher Net Profits, whilst mean yields below those indicated would at corresponding prices imply insufficient remuneration for Labor performed or alternatively inadequate interest on Capital invested.

(To be continued.)



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The following competitors in Crop Competitions have exhibited crops which, in the opinion of judges, will produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

### RUSSELL AND BUCCLEUCH—

A. J. Walker, Perponda—Felix.  
H. Sanders, Karoonda—Nabawa, Caliph.

### ALFRED—

G. E. Hyde, Paruna—Merriden.  
F. A. Hindow, Paruna—Free Gallipoli.  
A. E. Reichstein, Paruna—Nabawa.  
A. C. Webb, Paruna—Ford.  
A. A. Patterson, Paruna—Sultan.  
C. Wareing, Paruna—Nabawa.  
A. G. Petch, Meribah—Late Gluyas.  
A. A. Marsh, Meribah—Felix.  
A. R. Birch, Nangari—Gluyas, Nabawa.  
J. C. Auricht, Taldra—Gluyas, Late Gluyas, Caliph, South African.  
A. W. Traeger, Loxton—Sultan.

### ALBERT—

W. H. Todd, Caliph—Bald Early.  
T. C. Stott, Mindarie—Bald Early.  
P. J. W. Clonan, Halidon—Free Gallipoli.  
C. H. Russell, Halidon—Ranee.  
G. H. Sutherland, Copeville—Sepoy, Sultan, Free Gallipoli.  
A. E. Carslake, Kunlara—Sultan.

### NORTHERN YORKE PENINSULA—

T. H. Trengove, Bute—Waratah.  
E. W. Clasohm, Artherton—Ford.  
H. E. Aldenhoven, Artherton—Sepoy.  
M. Yelland, Kadina—Waratah.  
H. Rodda, Thrington—Free Gallipoli.  
T. Rodda, Thrington—Nabawa.  
C. Rodda, Thrington—Nabawa.  
E. Yelland, Thrington—Faun.

### JERVOIS—

A. Spriggs, Cleve—Gluyas.  
C. McCallum, Rudall—Gluyas.  
D. McCallum, Rudall—Sultan.  
G. H. Brandon, Rudall—Nabawa.  
E. H. Pearce, Rudall—Gluyas.  
W. F. Lake, Rudall—Nabawa.  
F. Hauschild & Sons, Cleve—Bena.

### LE HUNTE—

J. G. Spiers, Wudinna—Caliph.

### CHANDOS—

E. E. Meagher, Murrayville—Free Gallipoli.  
C. and L. Fischer, Piinnaroo—Begum, Free Gallipoli.  
E. Neindorf, Parilla—Caliph.  
C. E. Moyle, Parilla—Sultan.  
J. H. and C. H. Spratt, Lameroo—Sultan, Waratah, Felix.



Competition. Competitor. Address. Variety.

CHANDOS—*continued.*

C. L. Spratt, Lameroo—Waratah.  
A. J. A. Koch, Lameroo—Sultan, Gluyas.  
C. E. Koch, Lameroo—Sultan.  
R. C. Jacob, Geranium—Free Gallipoli.  
Hardy Bros., Jabuk—King's Early.  
W. E. Beelitz, Jabuk—Nabawa, Sultan.

BUXTON—

N. B. Hancock, Kimba—Faun.

SOUTHERN—

E. W. Woolfit, Strathalbyn—Sultan.  
Thomas Gros, Monarto South—Nabawa.  
C. F. Altmann, Monarto South—Leatherhead.  
C. Brooks, Woodchester—Nugget.  
W. Bermingham, Woodchester—Caliph.  
C. A. Whittlesea, Langhorne's Creek—Nabawa.  
Whittlesea Bros., Langhorne's Creek—Dan.  
Pearson Bros., Brinkley—Dan, Nabawa.  
H. D. and E. G. Humphrey, Brinkley—Nabawa.  
A. B. Jaensch, Bletchley—Currawa.

MIDLANDS—

W. R. Woods & Sons, Mintaro—Bena, Federation.  
A. E. Scarfe, Mintaro—Free Gallipoli.  
J. Ross, Mintaro—Free Gallipoli, Sepoy.  
R. W. Blachford, Mintaro—Free Gallipoli.  
A. L. Sandow, Mintaro—Wannon.  
Keith Shunke, Manoora—Federation and Dan.

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 L. Thornby, Merilden—Free Gallipoli.  
 A. J. Melrose, Mintaro—Free Gallipoli.  
 J. S. Miller, Auburn—Federation and Nabawa.  
 A. R. Bagshaw, Saddleworth—Dan.  
 J. G. Rogers, Saddleworth—Dan and Nabawa.  
 Crawford Bros., Saddleworth—Waratah.  
 F. Coleman, Saddleworth—Free Gallipoli.  
 G. & C. Frost, Manoora—Free Gallipoli.  
 J. H. Torr, Farrell's Flat—Bena.  
 S. Garrard, Merilden—Free Gallipoli.  
 L. A. Martin, Farrell's Flat—Bena and Free Gallipoli.  
 R. H. Martin, Farrell's Flat—Bena.  
 A. E. Crossing, Farrell's Flat—Free Gallipoli.  
 G. Miller, Farrell's Flat—Bena.  
 Jas. Brereton, Hanson—Leak's Rust Proof.  
 W. J. Woolcott, Hanson—Nabawa, Clarence, and Leak's.  
 C. P. Turner, Hanson—Nabawa.  
 Jas. Dempsey, Farrell's Flat—Federation.  
 H. H. Davis & Sons, Riverton—Waratah.  
 A. L. Frost, Riverton—Waratah.  
 J. W. Kelly, Riverton—Waratah.  
 A. G. Bright, Clare—Free Gallipoli.  
 V. M. Lally, Clare—Free Gallipoli.  
 W. S. McAuliffe, Buchanan—Nabawa.  
 W. Armstrong, Buchanan—Free Gallipoli.  
 L. V. Bell, Marrabel—Federation.  
 R. & N. Hughes, Kapunda—Onas and Sultan.  
 G. Hazel, Kapunda—Wannan and Nugget.  
 W. S. Kelly, Tarlee—Sultan, Currawa, and Sepoy.  
 Molineaux Bros., Tarlee—Free Gallipoli.  
 Clayton Dunn, Black Springs—Nizam.

MID-YORKE PENINSULA—

B. W. Vandeppeer, Petersville—Sultan, Nabawa.  
 Henderson Bros., Maitland—Ford.  
 A. R. Vandeppeer, Petersville—Nabawa.

SOUTHERN YORKE PENINSULA—

G. S. Brundell, Stansbury—Ranee, Nabawa.

NORTHERN—

W. F. Wurst, Laura, Nabawa.  
 J. C. Kleinig, Laura—Sultan.  
 V. Walter, Laura—Nabawa.  
 J. W. Prior, Gladstone—Turvey.  
 W. M. Neate, Caltowie—Ghurka, Nabawa.  
 E. J. Hughes, Laura—Waratah, Sultan.  
 J. Cross, Caltowie—Sultan.  
 J. E. Lehmann, Caltowie—Sepoy.  
 E. J. Holitt, Wirrabara—Currawa.

WESTERN—

F. T. Johns, Port Pirie—Currawa, Nabawa.  
 L. C. Roberts, Port Pirie—Currawa.  
 F. Jose, Nelshaby—Currawa.

MID-NORTH—

E. Smart, Gulnare—Ford.  
 J. A. Lyons, Georgetown—Ford.  
 Spencer Bros., Koolunga—Joffre.  
 F. A. Gray, Rochester—Joffre.  
 W. O. Eime, Blyth—Nabawa.  
 F. J. Pedler, Koolunga—Golden Return.



## SOME POPULAR FARMING FALLACIES.

[Address delivered by MR. W. J. SPAFFORD (Deputy Director of Agriculture) at the Forty-first Congress of the Agricultural Bureau.]

The belief in remarkable happenings which have little other than traditional support appears to be a common characteristic of human beings. There is that customary tendency to blindly believe some things without attempting to arrive at the truth, no matter how extraordinary the supposed influence or alleged happening might be, and it is only when a doubt is forcibly brought under notice that any attempt is made to investigate the matter. This certainly applies to a number of subjects connected with agricultural practices, and as some of these beliefs tend to hamper progress, a few of the more important are presented in this paper, to focus attention on them and to lead to some doubt as to their validity.

It is felt that despite the advance that has taken place in scientific knowledge in recent years, it is remarkable how strong is the belief in some of these alleged phenomena, and the sooner a clear understanding of these unusual occurrences is gained, the sooner will improvements and advancement be made in their direction.

The subjects being discussed are:—

*Blighting of Wheat Crops by Superphosphate.*

*Telegony.*

*Intra-uterine Influences.*

*Change of Seed.*

*Oats better than Barley as a Livestock Foodstuff.*

*Weevil develop spontaneously.*

*Stage at which Oats should be cut for hay.*

### “BLIGHTING” OF WHEAT CROPS BY SUPERPHOSPHATE.

Ever since Superphosphate was introduced into South Australian farming practices as a fertiliser for wheat crops, the idea that wheat will be “blighted” by the liberal use of this manure has persisted. In all of the Wheat-growing districts of the State there was a time, and that not long ago, when the maximum quantity of Superphosphate considered safe to use was very low. With the advancement of time, however, the average dressing of Superphosphate per acre has gradually increased throughout our wheat-growing areas, and as a consequence the alleged dangerous maximum application has also increased. Still, despite the fact that farmers have so often changed their opinions as to the exact amount of this fertiliser which will injure crops, many of them persist in the belief that the safety limit is only just a little ahead of the average dressing of the district in which they are farming. That these notions have had to be adjusted fairly rapidly will be realised by those who remember that as recently as 1915 there was a fair sprinkling of farmers in some of our Lower North districts who believed that it was unsafe to apply more than 60 to 70lbs. of Superphosphate (36 per cent.) to the acre, with wheat sown on fallowed land. In some of those districts at the present time the average dressing of Superphosphate applied to all annual crops grown, including Oats, Barley, and Peas, is over 100lbs. per acre, and most of this manure is what is known as 45 per cent. grade. In this connection all annual crops sown in the whole of County Light received an average of 117lbs. Superphosphate per acre, in



County Gawler the dressing is 112lbs., and in County Fergusson 109lbs. per acre, and these relatively high average dressings mean that some farmers are using around about 2cwts. of Superphosphate per acre with their wheat crops.

The term "*blighting*" is generally applied to that trouble with wheat crops when the moisture is dried out of the plants quicker than the roots can make it good, and is usually characterised by the plants going straight from the green to the dry stage without showing the natural changes of color which accompany normal ripening. In a mild attack the grain is badly pinched; in bad cases the plants dry out in a few days to a whitish color and become very light in weight; and there may be all stages in between these two extremes.

Even a mild attack of "*blighting*" always means a considerably decreased yield, and a much reduced weight per bushel of the grain that is harvested, and to show that neither of these happenings occur in South Australia from the use of Superphosphate, the following results of field experimental work with various dressings of Superphosphate are submitted:—

*Yields of Wheat grown with Various Dressings of Superphosphate.*

| Location of Experiments.  | Average Annual Rainfall. | Duration of Experiment. Years. | Mean Yield per Acre. Superphosphate per Acre. |      |       |      |       |      |
|---------------------------|--------------------------|--------------------------------|-----------------------------------------------|------|-------|------|-------|------|
|                           |                          |                                | No Manure.                                    |      | ½cwt. |      | 1cwt. |      |
|                           |                          |                                | Bush.                                         | lbs. | Bush. | lbs. | Bush. | lbs. |
| Roseworthy Agric. College | 17-85                    | 17                             | 11                                            | 15   | 16    | 27   | 17    | 52   |
| Veitch Expmntl. Farm ...  | 12-08                    | 14                             | 12                                            | 41   | 13    | 41   | 15    | 20   |
| Booborowie Expmntl. Farm  | 17-62                    | 13                             | 19                                            | 32   | 24    | 28   | 26    | 22   |
| Minnipa Expmntl. Farm ..  | 13-81                    | 13                             | 12                                            | 9    | 16    | 29   | 17    | 40   |
| Butler .....              | 15-00                    | 9                              | 10                                            | 13   | 15    | 38   | 17    | 43   |
| Yurgo.....                | 14-00                    | 6                              | 11                                            | 37   | 21    | 8    | 22    | 59   |
| Turretfield .....         | 18-11                    | 5                              | 12                                            | 59   | 15    | 32   | 15    | 11   |
| Wilkawatt .....           | 16-00                    | 4                              | 5                                             | 57   | 6     | 56   | 8     | 13   |
| Sandalwood.....           | 13-90                    | 3                              | 2                                             | 53   | 6     | 25   | 8     | 6    |
| Kimba .....               | 11-92                    | 3                              | 7                                             | 28   | 10    | 24   | 10    | 31   |
| Rudall .....              | 12-14                    | 3                              | 4                                             | 15   | 9     | 3    | 11    | 11   |
| Ungarra .....             | 16-85                    | 3                              | 16                                            | 12   | 23    | 11   | 25    | 17   |
| Appila .....              | 15-01                    | 3                              | 6                                             | 36   | 9     | 41   | 10    | 22   |
| Nelshaby .....            | 14-50                    | 3                              | 8                                             | 52   | 9     | 43   | 9     | 55   |
| Urania .....              | 19-00                    | 3                              | 7                                             | 6    | 9     | 16   | 12    | 41   |
| Smoky Bay .....           | 10-61                    | 3                              | 14                                            | 50   | 16    | 9    | 16    | 25   |
| Copeville .....           | 11-58                    | 1                              | 1                                             | 0    | 4     | 53   | 8     | 7    |
| Coorabie .....            | 12-00                    | 1                              | Nil                                           |      | 0     | 36   | 1     | 31   |
| Cortlinye .....           | 12-00                    | 1                              | 0                                             | 51   | 2     | 40   | 3     | 14   |
| Means (108 Crops) .....   | —                        | —                              | 11                                            | 28   | 15    | 26   | 16    | 53   |

These experiments, which were conducted in nineteen wheat-growing districts of the State with an average annual rainfall varying from just over 10½in. to about 19in., show a consistent increase in the wheat yield as heavier dressings of Superphosphate are applied, and it appears that no matter what the climatic conditions obtaining, comparatively heavy dressings of Superphosphate do not "*blight*" Wheat crops, at all events to the extent of reducing the yield of the crops so treated.

The next Table sets out the weight per bushel of Wheat produced at Roseworthy Agricultural College, when grown with different dressings of Superphosphate, for each of the past twenty-five years.



TABLE II.—*Weight per Bushel of Wheat Grown with Various Dressings of Superphosphate.*

| Year.                 | Superphosphate per Acre. |                    |                  |                  |
|-----------------------|--------------------------|--------------------|------------------|------------------|
|                       | No Manure.               | $\frac{1}{2}$ cwt. | 1cwt.            | 2cwt.            |
|                       | Lbs.                     | Lbs.               | Lbs.             | Lbs.             |
| 1905                  | 63 $\frac{1}{2}$         | 63                 | 62 $\frac{1}{2}$ | 63 $\frac{1}{2}$ |
| 1906                  | 59                       | 58 $\frac{1}{2}$   | 58 $\frac{1}{2}$ | 57 $\frac{1}{2}$ |
| 1907                  | 63                       | 63 $\frac{1}{2}$   | 62 $\frac{1}{2}$ | 63 $\frac{1}{2}$ |
| 1908                  | 64 $\frac{1}{2}$         | 63 $\frac{1}{2}$   | 64 $\frac{1}{2}$ | 64 $\frac{1}{2}$ |
| 1909                  | 62 $\frac{1}{2}$         | 63                 | 62 $\frac{1}{2}$ | 63               |
| 1910                  | 64 $\frac{1}{2}$         | 64 $\frac{1}{2}$   | 64 $\frac{1}{2}$ | 63 $\frac{1}{2}$ |
| 1911                  | 64                       | —                  | 63 $\frac{1}{2}$ | 63 $\frac{1}{2}$ |
| 1912                  | 66                       | 65 $\frac{1}{2}$   | 65 $\frac{1}{2}$ | 65 $\frac{1}{2}$ |
| 1913                  | 67 $\frac{1}{2}$         | 64                 | 60               | 60 $\frac{1}{2}$ |
| 1914                  | 63                       | 64 $\frac{1}{2}$   | 64 $\frac{1}{2}$ | 64 $\frac{1}{2}$ |
| 1915                  | 62 $\frac{1}{2}$         | —                  | 60 $\frac{1}{2}$ | 60 $\frac{1}{2}$ |
| 1916                  | 62 $\frac{1}{2}$         | 60 $\frac{1}{2}$   | 62 $\frac{1}{2}$ | 62 $\frac{1}{2}$ |
| 1917                  | 64 $\frac{1}{2}$         | 59 $\frac{1}{2}$   | 62               | 63               |
| 1918                  | 64 $\frac{1}{2}$         | 63 $\frac{1}{2}$   | 62 $\frac{1}{2}$ | 64 $\frac{1}{2}$ |
| 1919                  | 63                       | 64                 | 62 $\frac{1}{2}$ | 64 $\frac{1}{2}$ |
| 1920                  | 59 $\frac{1}{2}$         | 60                 | 61 $\frac{1}{2}$ | 58 $\frac{1}{2}$ |
| 1921                  | 58 $\frac{1}{2}$         | 52 $\frac{1}{2}$   | 57               | 59 $\frac{1}{2}$ |
| 1922                  | 62 $\frac{1}{2}$         | 63                 | 63               | 61 $\frac{1}{2}$ |
| 1923                  | 64                       | 63 $\frac{1}{2}$   | 63 $\frac{1}{2}$ | 63 $\frac{1}{2}$ |
| 1924                  | 63                       | 63 $\frac{1}{2}$   | 63               | 62 $\frac{1}{2}$ |
| 1925                  | 63 $\frac{1}{2}$         | 63 $\frac{1}{2}$   | 63               | 63               |
| 1926                  | 63 $\frac{1}{2}$         | 62 $\frac{1}{2}$   | 62 $\frac{1}{2}$ | 62 $\frac{1}{2}$ |
| 1927                  | 61                       | 62 $\frac{1}{2}$   | 58               | 61 $\frac{1}{2}$ |
| 1928                  | 58 $\frac{1}{2}$         | 62                 | 59               | 58 $\frac{1}{2}$ |
| 1929                  | 59 $\frac{1}{2}$         | 61                 | 58 $\frac{1}{2}$ | 60 $\frac{1}{2}$ |
| Means (25 Years) .... | Lbs.                     | Lbs.               | Lbs.             | Lbs.             |
|                       | 62.70                    | *62.24             | 61.88            | 62.23            |

\*23 years only.

The mean weight per bushel of the wheat produced with different manurial treatments as seen above certainly favors that from the plots not manured, but the difference between it and the plots regularly manured is not sufficiently great to ascribe it to the "blighting" of the crops receiving Superphosphate. As a matter of fact, nearly the whole difference is to be seen in the weight of the wheats of 1913 and 1915, when the "No Manure" plot had a considerable advantage, in that Red Rust was very bad on the manured plots in 1913, and in 1915 the fertilised plots made rank growth in the very favorable growing season, and then suffered to a slight extent in the dry Summer of that year, because of their early luxuriance.

On the experience gained in wheat-growing in South Australia, it appears that "blighting" of wheat is never directly due to application of Superphosphate, no matter how heavy the dressings, and it seems that the erroneous idea has risen from the fact that much of our wheat land, when originally opened up for cropping, was excessively rich in organic matter, which substance will lead to the "blighting" of the cereals. The extreme case in this connection is of common occurrence, for where hay has been stacked it is usual for the first three or four cereal crops grown on the site, after the land has again been brought under crops, to "blight" very badly. The same thing applies to old sheep camps, and in all places where there is an excess of organic matter in the soil.

Perseverance in the idea that heavy dressings of Superphosphate tend to reduce yields of wheat crops by "blighting" the plants, is delaying our agricultural progress, and the sooner it is realised, that in South Australia at all events, there is no danger whatever of such a happening, the more rapid will be the advance towards the utilisation of the most profitable applications of Superphosphate for our wheat crops.



## TELEGONY.

The term *Telegony* has reference to the traditional belief in the theory that a sire used on a dam leaves some influence in that dam which may affect future offspring by other sires. This opinion is so firmly held by some breeders, that they maintain that a female once mated to a sire of a different breed is no longer of use for the breeding of pure-breeds. The influence on offspring of a previous impregnation is more particularly considered as applying to horses, dogs and man, but breeders of other kinds of livestock have such trust in the assumption, that it has led, in different parts of the World, to the adoption of special rules to exclude from registration in various herd books females which have been mated to a sire of a different breed.

It is rather remarkable that such a tenaciously held traditional belief should have been developed from a few isolated instances, but it certainly seems to be so, and as a matter of fact, it appears, in English-speaking countries at all events, that much of the strength of the belief is based on the single case of Lord Morton's mare. Lord Morton had a virgin chestnut Arab mare—seven-eighths pure—mated to a male Quagga. The resulting female hybrid, plainly showed in shape and coloring that it was a hybrid. Sir Gore Ouseley, who purchased the mare, mated her with a black Arab stallion two years in succession; the first year a filly resulted, and the next year a colt was foaled. The following description of this filly and colt by the Arab stallion is given in a letter from Lord Morton to the President of the Royal Society, as quoted by Babcock and Clausen (i.) :—

"The two-year-old filly and yearling colt have the character of the Arabian breed as decidedly as can be expected where fifteen-sixteenths of the blood are Arabian; they are fine specimens of that breed, but both in the color and in the hair of their manes they have a striking resemblance to the Quagga. Their color is very marked, more or less like the Quagga in a darker tint. Both are distinguished by the dark line along the ridge of the back, the dark stripes across the forehead, and the dark bars across the back part of the legs. The dark stripes across the forehead of the colt are confined to the withers and to the part of the neck next to them. Those on the filly cover nearly the whole of the neck, and the back as far as the flanks. The color of her coat on the neck adjoining to the mane is pale and approaching to dun, rendering the stripes more conspicuous than those on the colt. The same pale tint appears in a less degree on the rump, and in this circumstance of the dun tint also she resembles the Quagga.

"Both their manes are black; that of the filly is short, stiff, and stands upright, and Sir Gore Ouseley's stud groom alleged that it never was otherwise. That of the colt is long, but so stiff as to arch upward and to hang clear of the sides of the neck, in which circumstance it resembles that of the hybrid. This is the more remarkable, as the manes of the Arabian breed hang lank, and closer to the neck than those of most others. The bars across the legs, both of the hybrid and of the colt and filly, are more strongly defined and darker than those on the legs of the Quagga, which are very slightly marked; and though the hybrid has several Quagga marks, which the colt and filly have not, yet the most striking—namely, the stripes on the forehead, are fewer and less apparent than those on the colt and filly."

Dealing with this case of the progeny of Lord Morton's mare, Professor E. Davenport (ii.) makes the following pertinent remarks:—

"It is one of the best evidences of the power of tradition that this single instance, happening more than a hundred years ago, has done duty ever since to prove (?) an exceedingly doubtful theory and an almost unaccountable belief. It is remarkable that so uncertain a circumstance, and one so easy of repetition, with universal experience tending constantly to throw light upon the subject, should have been so excessively over-worked. It shows, as no other instance has ever shown, the persistence of tradition, the extent of credulity in the presence of the phenomenal, and the willingness of men to repeat an assertion, or even an opinion, until by mere repetition it comes to have all the



force of authority. Without a reasonable doubt belief in *telegonic influence* rests upon stray instances, difficult of understanding by those who happened to be the observers, and hastily accepted as evidence. A single instance may be good negative testimony, but it is seldom worth much as positive evidence. . . . The thanks of the World are due to Professor Ewart for his excellent work in disposing, by direct experiment, of a citation that has done damage long enough."

Professor Cossar Ewart (iii.), of Edinburgh, carried out extensive breeding experiments with animals to determine whether such a doctrine as *telegony* is tenable, but in every case he was forced to the conclusion that alleged cases of infection may be accounted for most easily and most satisfactorily as instances of reversion to ancestral types. The illustrations from Ewart's work, having direct bearing on the case of Lord Morton's mare, and quoted by Babcock and Clausen (i.) are as follows:—

Professor Ewart mated the Burchell Zebra stallion "Matopa" to a chestnut Polo-pony "Valda," and twin hybrids resulted. The next year she produced a foal to a light-chestnut Thoroughbred stallion, after which she produced a third hybrid foal by "Matopa." Subsequently she produced another foal to a dark chestnut Thoroughbred stallion. The three hybrid foals from this mating were all richly striped, the stripes being more numerous, although less conspicuous, than those of the Zebra sire. The two foals produced from "Valda" by Thoroughbred sires, in no particular, either in color or form, resembled the hybrid foals, being chestnut in color without any suggestion of striping.

In a further experiment, Professor Ewart mated the Zebra stallion "Matopa" to a black West Highland pony "Mulatto," the result being a distinctly striped hybrid colt. The mare "Mulatto" was then mated to a black Arab stallion, and produced a foal which, when examined immediately after birth, showed numerous indistinct markings, so faint however, that their exact nature was in some doubt. Subsequently, "Mulatto" produced another foal by a dark-brown West Highland stallion which was also indistinctly marked. These foals suggested that, as in the case of Lord Morton's mare, *telegony* might occasionally occur. Professor Ewart, however, tested the matter further by mating two mares closely related to "Mulatto," to the same black Arab stallion which had sired the striped foal. Two foals were produced, one possessing indistinct markings similar to those on "Mulatto's" foals, whilst the other was more distinctly striped. There can be no question, therefore, that the striping of "Mulatto's" foals was a *consequence of normal hereditary processes* having nothing to do with *telegony*.

As Professor Ewart points out, there is abundant evidence that striping is common in horses, especially those of Oriental origin. Modern breeds of horses were largely derived from the forest type of Wild-horse of a yellowish-dun color, and this type had a dark stripe down the back, marks on the legs, and sometimes on face, neck, and withers. To-day it is not uncommon to get distinct markings on mongrel ponies, and certainly so with Arab crosses.

Babcock and Clausen (i.) give other interesting examples of direct experimental work in this direction, and amongst them they state:—"The evidence from Mule-breeding establishments where thousands of mules have been produced is all against the *doctrine of telegony*. Mumford has recorded a large number of concrete cases in support of the position. In a few instances mares have produced as high as ten, or eleven mule foals before they were bred to stallions, yet in not a single case was there positive evidence of *telegony*."

An instance (i.) dealing with dogs which Professor Ewart quotes is of considerable interest in this connection. A tan Dachshund bitch was mated to a tan dog, and produced a litter of pups having white bodies and tan cheeks and ears. This bitch had previously borne a litter of pups to a white Fox-terrier with tan cheeks and ears. Presumably both the tan Dachshund bitch and dog had long lines of tan or black-and-tan ancestors, so it was natural to conclude that this was a sure case of *telegony*. But



the breeder to whom the attention of this instance was called remarked that although the color of the pups was strongly reminiscent of the white Fox-terrier, the form and general characteristics were otherwise those of pure Dachshunds. Accordingly, he traced the pedigree of the dam and found that in the sixth generation it ran back to the kennel of a lady whose hobby was white Dachshunds with tan cheeks and ears. This particular mating had simply given opportunity for the expression of latent characters carried by the tan dogs. It was a perfectly intelligible case of *reversion*, not *telegony* at all.

Plenty of other examples could be quoted to show that where it has been alleged that instances of *telegony* have occurred, further investigations into the ancestry of the individuals concerned or direct experimental work, clearly demonstrate them to be cases of *reversion*. Even if there was some possibility of this weird notion, as conveyed in the term *Telegony*, occasionally proving true, it will be of such rare occurrence, judged by the very few cases on which the theory has been developed, that breeders need not anticipate trouble in this direction. As a matter of fact, until some positive evidence has been brought forward in support, it can be taken as a non-existent law of breeding.

#### INTRA-UTERINE INFLUENCES.

In all probability there are few things affecting breeding more widely believed in than the alleged effect of external happenings on the young still being carried in the uterus of its mother. It is common belief that imagination, strong mental impressions, emotions, frights, etc., of a pregnant female, are likely to lead to structural changes in the unborn offspring, and such alleged experiences have been used as the explanation for malformations, birth-marks, peculiarities, and for abnormalities of any and every kind that occur with human beings and other animals. The confidence of most people in *Maternal Impressions* or *Pre-natal Influences* is so well established that it often affects breeding practices, and it is still not unusual for some breeders to have certain colors exhibited before females while they are being served, when it is desired to secure young animals of that particular color, whilst others blindfold the female during service, and only remove the bandage after an animal of the desired color has been placed before her, so that the first thing seen after impregnation will be of the color wished for. These practices are only modifications of Jacob's methods of securing certain markings on animals, as carried out some thousands of years ago, and recorded in the Scriptures in the 30th chapter of Genesis. You will remember that Jacob went to work for his uncle, Laban, and contracted to labor for seven years to have Rachel given him as wife, and at the completion of the term had the elder daughter Leah foisted upon him instead, but, after a further seven years' work, he took Rachel as wife as payment for this period of labor. He continued as herdsman for Laban, stipulating that after a given date he should take all the speckled and spotted goats, cattle, and sheep which were born in Laban's flocks and herds, as wages for his hire. On the appointed day, all the speckled and spotted animals were removed from Laban's herds, and to ensure full payment for his labors, Jacob practised the methods described in verses 37 to 43 of Genesis xxx.:—

37. And Jacob took him rods of green poplar, and of the hazel and chestnut tree; and pilled white strakes in them, and made the white appear which was in the rods.

38. And he set the rods which he had pilled before the flocks in the gutters in the watering troughs when the flocks came to drink, that they should conceive when they came to drink.

39. And the flocks conceived before the rods, and brought forth cattle ring-straked, speckled and spotted.

40. And Jacob did separate the lambs, and set the faces of the flocks toward the ring-straked, and all the brown in the flock of Laban; and he put his own flocks by themselves, and put them not unto Laban's cattle.



41. And it came to pass, whensoever the stronger cattle did conceive, that Jacob laid the rods before the eyes of the cattle in the gutters, that they might conceive among the rods.

42. But when the cattle were feeble, he put them not in; so the feeble were Laban's and the stronger Jacob's.

43. And the man increased exceedingly, and had much cattle, and maidservants, and menservants and camels and asses.

This classic case from the Old Testament, so often quoted in support of the power of Maternal Impressions, is the sort of explanation expected from the less-skilled towards the success of a highly-skilled breeder such as Jacob, who obviously knew how to mate animals together with a big chance of securing spots and speckles.

Such theories as *Intra-uterine Influences*, *Telegony*, etc., appear to have developed because of the impression made on the mind by rare and uncommon occurrences, and the ordinary happenings of life are ignored when considering these sensational events. As a matter of fact, in view of recent investigational work, this doctrine of *Maternal Impressions* appears to be particularly unreasonable, because it now seems certain that other than the natural characteristics the offspring will inherit from its mother, the fetus is only dependent on its mother for nourishment. This fact is brought out by experiments made by Mr. Walter Heape, of Cambridge (ii.), dealing with the transplantation of ovaries from one female to another:—

“Two segmenting ova were obtained from an Angora doe rabbit, which had been fertilised by an Angora buck 32 hours previously and were immediately transferred to the upper end of the fallopian tube of a Belgian Hare-rabbit which had been fertilised three hours before by a buck of the same breed as herself. In due course this Belgian Hare-doe gave birth to six young. Four of these resembled Belgian Hare-rabbits, but the other two were undoubted Angoras. Both of the Angoras were born bigger and stronger than any of the other young, and they all along maintained their supremacy in this direction.”

In view of the fact that when the undoubted breeding of animals is known for a sufficient number of generations, it can be foretold with certainty what the offspring will be like when two of the same breed are mated together, and also when we remember that various breeds of the different kinds of animals have been kept true to type so long, it does seem wonderful that people can believe a theory which makes such extravagant claims as does this *Intra-uterine Influences*. The statement made by Darwin (iv.), when writing to Sir Joseph Hooker on the subject, gives the true explanation of many of the alleged cases. He said:—“W. Hunter told my father, then in a lying-in hospital, that in many thousand cases he had asked the mother before confinement whether anything had affected her imagination and recorded the answers, and absolutely not one case came right, though when the child had anything remarkable they always made the cap to fit.”

If all these small things, such as seeing certain colors, mental agitations, worries, accidents, frights, etc., were liable to affect the young being carried by their mothers, what a confused mixture of colors all our animals, including man, would consist of in these days of gaudy advertisements and bright colorings generally; what a collection of maimed youngsters would be about because of the frights from motor cars and other fast travelling vehicles; and it appears almost impossible to visualise the enormous numbers of malformed children that would have been born from 1915 to 1919 in those countries where the Great War was fought.

There are no proved cases of young animals being marked or changed from the normal by external influences whilst still in the uterus; alleged happenings in this



direction have never been reproduced under controlled conditions; and fortunately even the alleged happenings are of such rare occurrence that breeders need fear no interference from this source.

#### CHANGE OF SEED.

Throughout the grain-growing districts of the country, and it appears to be World-wide, there is a strongly held belief in the necessity for changing seed. It is contended that the continuous growing of a variety from seed produced on the one farm naturally leads to a rapid deterioration of that seed, and if the variety is to be persisted with, it then becomes necessary to secure seed from a different source. The reliance placed by some growers on change of seed as a means of increasing yields of crops is so highly regarded that they always purchase seed to be used from outside sources, and would never think of using seed grown on their own farms for a number of years, or for that matter will not even use seed grown in their own district. This belief is the more remarkable, because in all cases where carefully conducted investigations, on the matter have been carried out, and *where ordinary reasonable care has been taken to prevent deterioration of the seed produced*, home-grown seed gives better results than does seed of the same kind produced in another locality.

A considerable amount of work has been done in testing this question of the effect of change of seed in many grain-growing countries, but perhaps of that done under field conditions, there is nothing more thorough and important than that undertaken by Professor G. W. Shaw, of the University of California. Professor Shaw, who has four Agricultural Experimental Stations under his control, grew wheat at these stations, and sent seed to different parts of the State, where it was grown for varying periods before being returned to its original home. On the return of the seed from private farms, it was grown alongside seed which had been continuously grown on the Station farm, and without a single exception the "home" seed gave greater returns than the "change" seed. In reporting on the results of the investigations Professor Shaw stated—"Loss always occurs by mere change of seed, except only when there is a better type of wheat or more vigorous grain of the same type."

In our own State, "Gluyas" and "King's Early" have been grown continuously at Roseworthy Agricultural College for thirty-five years and both varieties are a good deal better now than they have been at any time in that period.

If seed is deteriorating to the extent of requiring replacement by seed from another locality, it shows that ordinary care has not been taken with it, and the *deterioration is the result of neglect*, and is not due to continuously growing it on the one farm.

#### OATS BETTER THAN BARLEY AS A LIVESTOCK FOODSTUFF.

With quite a number of livestock breeders and farmers generally, at all events with those of European origin, there is a firmly fixed fancy that Oats are a much better foodstuff for livestock than is Barley. Some of these people go as far as to claim that Barley is not even a useful feed for the large farm stock; others feel that when using Barley the point above which it becomes dangerous to increase the amount given to the animals is quickly reached, except for pigs; whilst others again, although using Barley for all kinds of animals, consider that it is only a fattening foodstuff and quite unsuitable for any other purpose. It appears that this notion is a European prejudice developed through lack of knowledge of feeding with Barley, because it is quite common to hear the expression, "*You cannot use much Barley for farm livestock because it is too heating*," whereas in Mediterranean countries, where much Barley is grown and Oats are not well known, and where the climate is at least as hot as is our own, the idea of the feeding value of these two grains is expressed in, "*You cannot use much Oats for farm livestock because they are too heating*." That these ideas of the value of the two grains must be a matter of lack of experience is easily seen by a look at the figures presented in Table III., which are based on the results of actual feeding experiments.



TABLE III.—Analyses of Oats and Barley.

|                        | Crude Nutrients. |           |               |           |                          |             | Digestible Nutrients. |           |                          |             |                            |
|------------------------|------------------|-----------|---------------|-----------|--------------------------|-------------|-----------------------|-----------|--------------------------|-------------|----------------------------|
|                        | Water.<br>%      | Ash.<br>% | Protein.<br>% | Fat.<br>% | Carbo-<br>hydrates.<br>% | Fibre.<br>% | Protein.<br>%         | Fat.<br>% | Carbo-<br>hydrates.<br>% | Fibre.<br>% | Starch<br>Equivalent.<br>% |
| Barley (Two-rowed)—    |                  |           |               |           |                          |             |                       |           |                          |             |                            |
| (V) Large grains ..... | 13.3             | 2.3       | 8.8           | 1.8       | 71.0                     | 2.7         | 6.2                   | 1.6       | 65.3                     | 1.2         | 75.0                       |
| (V) Medium grains ..   | 13.3             | 2.5       | 9.5           | 2.1       | 68.6                     | 3.9         | 6.6                   | 1.9       | 63.1                     | 1.3         | 73.9                       |
| (V) Flat grains .....  | 13.3             | 2.8       | 10.3          | 2.5       | 64.4                     | 6.6         | 7.2                   | 2.2       | 59.2                     | 1.3         | 69.8                       |
| (Vi) Prior .....       | 13.3             | 2.7       | 8.0           | 1.3       | 70.7                     | 4.0         | 5.6                   | 1.2       | 65.0                     | 1.3         | 73.4                       |
| Barley (Six-rowed)—    |                  |           |               |           |                          |             |                       |           |                          |             |                            |
| (Vi) Roseworthy Oregon | 13.3             | 2.6       | 11.5          | 1.1       | 66.0                     | 5.5         | 8.0                   | 1.0       | 60.7                     | 1.8         | 70.7                       |
| (Vii) Cape .....       | 13.3             | 4.6       | 5.4           | 0.6       | 56.7                     | 19.4        | 3.8                   | 0.5       | 52.2                     | 6.4         | 60.1                       |
| Oats—                  |                  |           |               |           |                          |             |                       |           |                          |             |                            |
| (V) Large grains ..... | 13.3             | 3.0       | 8.2           | 4.2       | 63.2                     | 8.1         | 6.2                   | 3.5       | 50.6                     | 2.1         | 63.1                       |
| (V) Medium grains .... | 13.3             | 3.1       | 10.3          | 4.8       | 58.2                     | 10.3        | 8.0                   | 4.0       | 44.8                     | 2.6         | 59.7                       |
| (V) Flat grains .....  | 13.3             | 3.5       | 12.7          | 5.6       | 49.9                     | 15.0        | 10.2                  | 4.6       | 37.0                     | 3.7         | 54.8                       |
| (Vi) Early Burt .....  | 13.3             | 3.4       | 8.3           | 7.0       | 57.2                     | 10.8        | 6.3                   | 5.6       | 43.5                     | 3.0         | 61.1                       |
| (Vi) Scotch Grey ..... | 13.3             | 3.1       | 8.9           | 6.2       | 58.3                     | 10.2        | 6.8                   | 4.9       | 44.3                     | 2.9         | 60.8                       |
| (Vi) Sunrise .....     | 13.3             | 3.1       | 10.0          | 4.4       | 59.2                     | 10.0        | 7.6                   | 3.5       | 45.0                     | 2.8         | 59.3                       |
| (Vi) Cape .....        | 13.3             | 3.1       | 9.7           | 5.4       | 56.7                     | 11.8        | 7.3                   | 4.3       | 43.1                     | 3.3         | 59.3                       |
| (Vi) Lachlan .....     | 13.3             | 2.9       | 8.4           | 4.4       | 59.3                     | 11.7        | 6.4                   | 3.5       | 45.0                     | 3.3         | 58.7                       |
| (Vi) Algerian .....    | 13.3             | 3.4       | 9.4           | 4.8       | 56.7                     | 12.4        | 7.1                   | 3.8       | 43.1                     | 3.5         | 58.3                       |

\*\*\* (v.) European samples quoted by O. Kellner.

(vi.) Roseworthy Agricultural College, by A. T. Jefferis and C. S. Piper.

(vii.) Roseworthy Agricultural College, by Professor A. J. Perkins.

When foodstuffs of the same type are to be compared, the *Starch Equivalent method* as advocated by Professor O. Kellner appears to give a very close approximation as to how they will be utilised when fed to livestock, and when they are to be used for maintenance or fattening purposes, this method of estimating their value can be used with a good deal of confidence. If to be used for the production of milk, as for milking cows, ewes with lambs, etc., or for work, as with horses, this method of comparison may need some modification, because the amount of digestible protein present in the foodstuff and its relationship to the other digestible nutrients, affect its value for these purposes. In any case, a glance at the figures in the above table shows that not only is the Starch Equivalent value of the Barleys much above that of the Oats, but that with the single exception of the flat grains of European Oats, with the high content of 10.2 per cent. digestible protein, the good Barley samples contain nearly as much digestible protein as do the various Oat samples. These figures show very clearly that for maintenance and fattening purposes Barley is worth more, pound for pound, than are Oats, and that for the production of milk and work a good sample of Barley is at least equal to Oats.

Barley is gradually being recognised as a suitable foodstuff for Sheep as well as for pigs, and a few farmers have begun using barley for Dairy Cows, particularly in those places where Lucerne is one of the principal foods supplied to the Cows, but we have yet to reach the stage when Barley will be looked upon as the chief concentrated foodstuff supplied to all farm livestock, including milking cows and working horses. It is of the utmost importance that we give this question of the feeding of home-grown Barley to our farm livestock the most serious consideration, because we can grow Barley very readily in so much of our Wheat-growing country, whereas only some of it grows heavy crops of good quality Oats.

#### WEEVILS DEVELOP SPONTANEOUSLY.

Despite the fact that much information was broadcasted throughout the State at the time when weevils were doing so much damage to the wheat stacked for the British Government during the Great War, and also that so many farmers have known weevils



to be present in their barns for a great number of years, there are still a lot of people who have to handle cereals who firmly believe that *weevils* develop from inside the grain, and that grain only has to be enclosed in a receptacle of some kind, and *weevils* will spontaneously appear. Some explain this alleged happening by making the assertion that the weevil "germ"—whatever that might be—finds its way into the grain at flowering time or soon after. Of course there is no such happening as spontaneous generation, at all events not where a relatively high form of life like a *weevil* is concerned, and the persistence in such a belief only delays the day when methods of control will be understood and practised.

The life history of the *weevils* which do so much harm to stored grain is thoroughly well-understood for all sets of natural conditions where they are troublesome, and for the principal *weevil* found in this country, viz., the Rice Weevil (*Calandra oryzae*), it is somewhat as follows:—

A female *weevil* which has been fertilised by a male makes a groove or a hole in the skin of a cereal grain, without being particular as to the situation of the hole, and lays an egg in the opening. From this egg a small yellowish-white grub with a brownish head and without legs, hatches out, and as it is then in close contact with its food supply it immediately begins eating the inside of the grain. In warm weather the grub remains as such for about 14 to 18 days, when it turns to a chrysalis. It remains for 3 to 9 days in this form, after which it emerges as a perfect insect and continues to feed on the inside of the grain, and eventually it eats its way out and goes in search of a mate. In the beetle stage the *weevil* does more damage than when in the grub stage.

A considerable amount of work has been done in connection with *weevils* in most grain-growing countries of the World, and as a consequence it is known that in a climate such as our own, in the warm part of the year, it takes about 19 to 22 days for *weevils* to develop, between the egg and the perfect insect, and that four generations can be expected each year, whereas in tropical countries six broods a year can be anticipated. As each female lays about 150 eggs it is easy to realise what are the theoretical possibilities of producing *weevils* if all eggs hatched and all grubs developed during six generations, but as this theoretical maximum is never even approached in nature, it is only interesting to contemplate the countless millions that might result. Under actual counts it is found that during a normal summer one pair of *weevils* will produce a total of about 6,000 insects.

There is no mystery about the development of the *weevil*, and it is perfectly well known that before grain can become infested by *weevils* it must come in contact with mature female insects, so that they can lay their eggs inside the skin of the grains. A realisation of this fact is necessary before proper control methods can be taken to combat the pest.

#### STAGE AT WHICH OATS SHOULD BE CUT FOR HAY.

The practice has developed in this State of allowing Oat crops to become almost ripe before cutting them for hay. Very few farmers commence cutting Oat crops until much of their green color has gone and until they show a lot of purplish coloration in the stalks, and so by the time the cutting is completed a good deal of the crop is nearly ripe. This practice has led to the development of an accompanying habit of judging the quality of Oaten Hay-chaff by taking a double handful of the chaff, blowing the chaffed stalks away from the grain, and carefully examining the grain left in the hands. If there is a lot of well-developed grain in the chaff it is considered by many to be really good Oaten Hay-chaff.

This practice seems to have developed because of two reasons:—(a) In those parts of the State where power threshers are in use, the method of handling much of the Oat crop has been to allow it to approach maturity, cut it with a binder, and store it in stacks; if the price for Oats is good that season the stack is threshed and the grain



sold, but if more money is to be made from hay, the stack is chaffed and sold as Oaten Hay-chaff. (b) In most of the State the principal variety of Oat grown is the one known as "Algerian," and an unwarranted prejudice has developed which has led to the belief that this particular variety of Oat is *bitter* during all stages of its growth up to the time it approaches maturity, and it is considered that this *bitterness* is not overcome until the plants show a good deal of purplish color in the stalks.

It is gradually being realised as time goes on that this *alleged bitterness* of green Oats is an unjustifiable assumption, and it is now becoming recognised that any gain made in palatability by waiting until the green stage is almost past, is more than compensated for by the loss of nutriment. This fact is clearly brought out in the following analysis of Oats cut at different stages of growth:—

TABLE IV.—Oats Cut at Different Stages of Growth (v).

|                         | Before Heading. |            | In Flower. |            | Ripe.      |            |
|-------------------------|-----------------|------------|------------|------------|------------|------------|
|                         | Crude           | Digestible | Crude      | Digestible | Crude      | Digestible |
|                         | Nutrients.      | Nutrients. | Nutrients. | Nutrients. | Nutrients. | Nutrients. |
|                         | %               | %          | %          | %          | %          | %          |
| Moisture .....          | 10.0            | —          | 10.0       | —          | 10.0       | —          |
| Ash .....               | 8.4             | —          | 7.0        | —          | 5.4        | —          |
| Protein.....            | 12.9            | 9.7        | 7.4        | 5.3        | 6.6        | 4.5        |
| Fat .....               | 2.8             | 2.0        | 2.3        | 1.6        | 2.3        | 1.5        |
| Carbohydrates .....     | 44.7            | 28.2       | 40.3       | 25.4       | 39.6       | 24.2       |
| Fibre .....             | 21.2            | 12.7       | 33.0       | 18.2       | 36.1       | 15.9       |
| Starch Equivalent ..... | 41.5            |            | 32.5       |            | 26.2       |            |

These figures, and particularly those representing the Starch Equivalents, show how rapidly the Oat plant loses its nutriment as it approaches maturity, and how delaying the cutting-time until near ripeness reduces the value of the hay eventually secured. These Starch Equivalent values mean that 1 ton of hay made from Oats in flower are equal in feeding value to 24.8cwts. of ripe Oats. It is recognised, of course, that hay made from Oats cut at flowering would have a slight tendency to scour working horses, or would be, as we say, too "soft" a feed for workers, but the longer the delay after flowering before cutting oats for hay, the poorer the feed-value of the hay cured. In making oaten hay for cows in milk, the crop should be cut at or near flowering time, whereas if required for working horses it should be cut ten days to a fortnight after flowering, and while the grain is still in the "milky" stage.

## SUMMARY.

### *Blighting of Wheat Crops by Superphosphate.*

1. The trouble known as "*blighting*" of wheat crops is characterised by the plants going straight from the green to the dry stage without showing the natural changes of color which accompany normal ripening.

2. In a mild attack of "*blighting*" the grain is badly pinched and the yield considerably reduced.

3. As the recorded yields from 19 centres in the State, with up to 17 consecutive years' crops, show a consistent increase in yield as the amount of Superphosphate is increased up to 2cwts. per acre, and as the weights-per-bushel for the past 25 years from the Wheat plots receiving various dressings of Superphosphate at Roseworthy Agricultural College do not show much variation, it seems certain that in South Australia there is no danger of "*blighting*" being caused by relatively heavy applications of Superphosphate.

### *Telegony.*

4. The term *Telegony* refers to the traditional belief in the theory that a sire used on a dam leaves some influence in that dam which may affect future offspring by other sires.



5. This traditional belief has been developed from a few isolated cases, and in many places the notion has been raised on the single instance of Lord Morton's mare.

6. The classic and overworked case of the crossing of Lord Morton's Arab mare with a Quagga, and then securing striped foals from her when mated to Arab stallions, has been disposed of by the experiments of Professor Cossar Ewart, of Edinburgh.

7. In all alleged cases of *telegony*, further investigation into the ancestry of the individuals concerned, or direct experimental work, have clearly demonstrated them to be cases of reversion.

8. The alleged cases have been rare, and all have been disposed of where investigated, and so until some positive evidence is forthcoming it can be taken that *telegony* is a non-existent law of breeding.

#### *Intra-uterine Influences.*

9. The term *Intra-uterine Influences*, also known as *Maternal Impressions* and *Pre-natal Influences*, refers to the alleged effect of external happenings on the young still carried in the uterus of the mother.

10. It is very doubtful if there is anything else connected with breeding so firmly established and so widespread, as faith in this traditional belief.

11. Even at the present day, modifications of Jacob's methods of thousands of years ago, to secure certain results by affecting the fetus, are being practised by some breeders.

12. Following on the experiments of Heape, it appears certain that other than the natural characteristics the offspring will inherit from its mother, the fetus is only dependent on its mother for nourishment.

13. When a child is born with any peculiarity, the mother, guided by tradition, hunts for some experience in the preceding months, and usually succeeds in finding one to fit the occasion.

14. Alleged cases of young animals being marked or changed from the normal whilst still in the uterus have never been reproduced under controlled conditions, and in any case the alleged happenings are of such rare occurrences that breeders need fear no interference from this source.

#### *Change of Seed.*

15. It is often contended that continuously growing seed on the one farm leads to deterioration, and that it is frequently necessary to change the seed.

16. Considerable work has been done in this connection with the grain crops; and Professor G. W. Shaw of California sums up the position well, when he says:—"*Loss always occurs by mere change of seed, except only when there is a change to a better type of wheat or more vigorous grain of the same type.*"

17. If seed is deteriorating to the extent of requiring replacement, it shows that ordinary care has not been taken with it.

#### *Oats Better than Barley as a Livestock Foodstuff.*

18. Oats are favored as a foodstuff in this country as against Barley, because it is considered that in this climate Barley is too heating for livestock, whereas in other hot countries where Oats are not well known they are objected to because they are more heating for livestock than is Barley.

19. Analyses show that for fattening and maintenance purposes, Barley is worth more pound for pound than is Oats, and that for the production of milk and work, it is about equal to Oats.

20. It would prove advantageous to the State to adopt Barley as the principal grain-feed for all farm livestock, because we can grow the crop well in most of our wheat-growing districts.

#### *Weevils Develop Spontaneously.*

21. There is no such thing as spontaneous generation for relatively highly developed insects like weevils.



22. The *female weevil* lays eggs in holes she has made in the skin of grains which hatch as small yellowish-white grubs. The grub lives on the inside of the grain about a fortnight or more, then changes to a chrysalis, in which form it remains for 3 to 9 days, after which it emerges as a perfect insect. The insect eats out the inside of the grains and eventually comes out and goes in search of a mate. In our climate, four generations of *weevils* can be expected each year.

*Stage at which Oats should be Cut for Hay.*

23. Oats are generally allowed to approach maturity before they are cut for hay.

24. Analyses and feeding results show that the Oat plant rapidly loses its nutriment as it approaches maturity.

25. Oaten hay for cows should be cut as near flowering time as possible, and if to be used for working horses the cutting should be done about 10 to 14 days after flowering.

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On Thursday morning delegates visited the Waite Research Institute, and on Friday morning the premises of the Shell Company of Australia Limited at Birkenhead.

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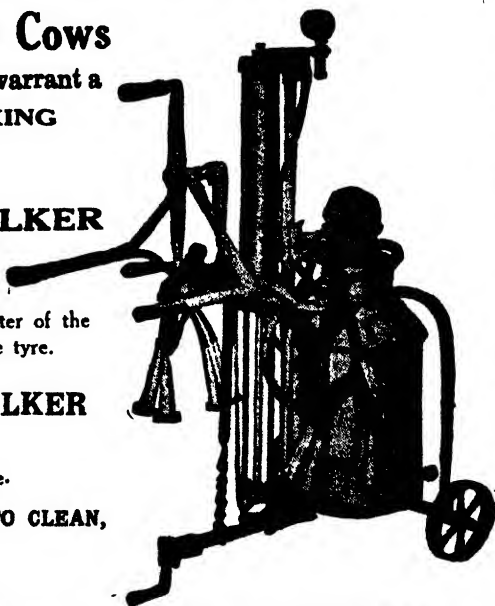
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## IMPROVEMENT IN FARM POULTRY.

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*[Paper read by MR. C. F. ANDERSON (Acting Poultry Expert) at the Forty-first Congress of the Agricultural Bureau.]*

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It is generally realised that in common with all other lines of primary produce, costs in poultry egg production must be reduced, and there is undoubtedly room for improvement, especially in farm poultry.

For some years egg production in South Australia has been limited to farm poultry, but during the last eight to ten years conditions have been undergoing a change. Following on the work which has been done and which is still going on at the Parafield Poultry Station, which has been the medium of establishing commercial poultry farming in South Australia, large numbers of poultry producers concentrating all their efforts on poultry breeding have established modern poultry farms in various parts of the State, until to-day commercial poultry farming is a soundly established industry in South Australia, and is rapidly expanding. Mammoth incubators have been installed, large brooder houses built, modern scratching sheds to hold hundreds of birds erected, and proper attention paid to breeding, feeding, and the marketing of eggs. As a result, at least 30 per cent. of the eggs marketed in Adelaide to-day are produced by commercial poultry men, and the production of this class of egg is rapidly increasing. The question may be asked, "What effect this has on farm poultry?" It has meant that with the increasing quantities of high quality eggs it is becoming more difficult each year to dispose of the lower quality eggs.

It must be borne in mind that the difference in quality between the farm egg and a commercially produced egg, especially in the early part of the season, when ample supplies of succulent green feed are available, is not very noticeable; but as the summer approaches, green feed becomes rank and tough on the average farm, whereas the commercial poultry farmer feeds large quantities of green feed grown under irrigation, and so the commercially produced egg is of much better quality.

It is especially desirable at the present juncture that every effort be used to increase exports; in fact, it is essential to the stability of the poultry industry that this be accomplished. It is very doubtful, however, if 20 per cent. of farm produced eggs are suitable for export. Commonwealth export regulations demand:—

- (a) All eggs shall be individually examined by the candling process.
- (b) Eggs which have been subjected to any preservative process or which have been placed in cold store prior to being submitted for export shall not be packed.
- (c) Any egg which has a broken or damaged shell, or which is in an unsound or other abnormal condition, shall not be packed.
- (d) All eggs must be perfectly clean, *i.e.*, they must be free from stain, dirt, and other foreign matter.
- (e) All eggs must be fresh, *i.e.*, after examination by the candling process are, in the opinion of an officer, fit for human consumption and are not more than seven days old.

These regulations may, to the inexperienced, appear rather drastic, but after careful analysis they only mean that the eggs must be new laid, perfectly clean in the shell, and free from abnormalities. With a little care in regard to clean nest accommodation, getting the eggs to the packing floor as quickly as possible after being laid, the exportable quantities would be largely increased.

For instance, if during the months of export—August, September, and October—there are 200,000 dozen eggs per week coming on to the Adelaide floors from the farms, 20 per cent. of these is equivalent to 40,000 dozen suitable for export, leaving a balance of 160,000 dozen eggs per week which are thrown back on the local market, because they



are not up to export standard. This will convey some idea of the serious effect these eggs have on the market for the remainder of the year, besides the actual financial loss suffered, through not being able to ship these eggs.

#### METHODS WHERE IMPROVEMENT CAN BE EFFECTED.

1. *The Keeping of a Better Class of Stock.*—Pure breeds are infinitely better producers than crossbreds. South Australian White Leghorns are world renowned as egg producers; Black Minorcas are also good layers of large eggs. Black Orpingtons, Rhode Island Reds, and Barnevelders are specially suited for farm conditions. When purchasing stock, obtain same from only birds laying full-sized 2oz. eggs and over. Remember that the size of the egg is more a matter of strain than of breed. Several strains of Leghorns are noted layers of large eggs, whilst others are only able to produce small eggs.

2. *Hatching Methods.*—For years the average farmer has depended too much on the hen as a means of hatching, with the result that his hatching has not been started until the commercial man has finished, principally for the reason that the average hen does not "go broody" until the warmer weather is experienced, and that is from October onwards. Hatching at this time is not profitable; late hatched birds never do well—they are slow to mature; in fact, they very seldom develop into good birds, and their egg production does not commence until the spring, when prices are low. If poultry are to be kept profitably, they must lay a percentage of eggs during the winter, when prices are highest. Late hatched birds will not do this. For winter egg production the hatching must be done during July, August, and September, according to the district and the breed of bird hatched, and the only way the hatching can be done during these months is by the incubator.

3. *The Age of the birds* is also another important factor in the profitable production of eggs. After two years of production the fowl has passed her most profitable period as an egg producer, although the best of the birds could be kept for a further 12 months as breeders.

Summarized, the following practices, if followed, would lead to general improvement in farm poultry:—

1. The keeping of pure birds only.
2. The replacement of a percentage of stock each year.
3. Hatching only during the months of July, August, and September.
4. The disposal of all birds with the exception of the very best after two years of production.
5. The disposal of all surplus male birds, to assist in the reduction of cost of feed and in the production of a higher class egg.
6. The regular marketing of all eggs—once a week during the winter and twice a week in the summer.
7. Provision of clean nests, so that eggs are marketed free from dirt and stains, &c.

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## DIETS IN THE HOME.

[Paper read by MISS E. CAMPBELL (*Dip. Dom. Econ., Inspector of Domestic Arts, Education Department*) at the Women's Session of the Forty-first Congress of the Agricultural Bureau.]

Right from the time when Nebuchadnezzar, King of Babylon, besieged Jerusalem in 607 B.C., and ordered several selected young men to be fed for three years on the same meat and wine as he was using in order to prepare them as his courtiers, thought has been given to the problem of which food is necessary and best to produce good, healthy bodies. This was brought about by one of the selected youths declining the meat and wine and preferring pulse foods and water. This was his usual diet. The prince who had charge of the dietary programme was very loath to permit the change over, but after trying the simpler fare for a short period, the youths were carefully examined, and it was found that this particular young man had a better appearance, therefore he was allowed to continue with his simple diet. Much has been learnt as to the value and work of our foodstuffs since the reign of Nebuchadnezzar, and it has become a fairly common study as the means of cooking and preserving have been brought within the reach of all housewives. It falls to the mother's lot to decide each day what and how much is to be consumed by the members of her household. This is the planning of a diet or course of food to be taken by the person.

To be able to plan successfully, it is necessary to understand something of the body requirements, also to know the composition and value of the various foods that are to be made available. We all realise that the body consists of bone, muscle, sinew, nerves, blood, and water, and whether doing strenuous work or resting quietly there is work going on in the body such as breathing and the flowing of the blood. This causes a wearing away of some of the tissues; these have to be replaced by nourishing food being supplied to the body. It has been found that the body needs (1) energy for the daily work and a supply to allow for a storage of extra energy for emergency when a greater demand is made on the body. This heat to give the energy is obtained from the sugar and starch content of the food. (2) The muscles and tissues have to be repaired, and a supply has to be made available for further growth. Muscles and tissues are built up by proteins, which are the flesh-formers. (3) The blood has to be purified and the bones strengthened; this is obtained from mineral salts that we get from our foods. (4) Vitamins which are essential to growth and health; they are found in nearly all fresh foods. (5) Water is an important item, for it forms a large proportion of the tissues, and it helps to regulate the body processes. (6) Another help to regulate the body is roughage, which is obtained from vegetables.

As there are so many different duties for the food to do, and each duty can only be performed by a particular food, this gives the key to all diets—we hear of low diet, when liquids are mostly used to reduce the temperature of a patient—then there is a light diet consisting of nourishing liquids and light dishes, such as gruel, arrowroot, fish, and simple milk puddings, it is generally given to a patient in the early stages of convalescence. Another is a milk diet, supplying as much milk as the patient can be encouraged to take. There are numerous ways of serving milk—iced milk, junket, jelly, and milk drinks; this is generally given when the patient has gastric trouble. Also we hear of meat diets when it is necessary to give the body as much red juice from the meat as possible, it helps to supply blood. And we must not forget the vegetarian diet, when no meat is allowed; but the general is a mixed well-balanced diet, when every kind of foodstuff is included. Each of these diets has to be employed when necessary. The next step is to know the value of foods and how much of each to use. The flesh formers, or proteins,



are obtained from all animal foods, such as meat, eggs, milk, cheese, fish, and a small quantity from flour (wheat), peas, and beans. The heat givers, or, as they are called, the carbohydrates, are the starch and sugars; we find these in all vegetables and fruits. Fat is also a heat giver, although it is not a carbohydrate. From fruits and vegetables, a small amount from meat and milk, we procure the mineral salts to purify the blood and strengthen the bones; these are calcium, magnesium, potassium, phosphates, sodium, iron, lime, and sulphur. It was the lack of these which used to cause scurvy and other skin diseases.

Knowing what the foodstuffs will supply, it is a good housewife who can economically use the supply at hand. The work being performed by each member of the family will necessarily govern the amount demanded by the body; it is worse to be over-fed than to be under-nourished—one leads to poisons in the body, which set up most of our diseases, the other can be relieved as soon as a further supply is available, but the body in the meantime has been consuming the reserve that was stored in the tissues earlier in life. A child has to have sufficient food to supply growth and to allow for the wonderful amount of energy expended whilst playing around, he does not spare himself one atom; as he grows older the play and movements are less violent, but the muscles and bones seem to be rapidly developing. These are points that will influence the mother's decision on meals. Father must not be overlooked, for heavy work and long hours make a greater demand on the body than when the time is spent quietly with easy work. It is really the mode of life that governs the amount of nourishment to be taken, and for the body to get all its requirements it is necessary to have a mixed diet, no one particular class of foodstuff greatly predominating, but taking in all kinds of foods, such as meat, eggs, milk, fish, fruits (fresh, dried, or preserved), all kinds of vegetables (cooked and salad vegetables), cereals, bread (both brown and white), nuts, and plenty of water—either as water, tea, coffee, or other beverages—but there must be a goodly amount of liquid. This will ensure a complete supply of vitamins, proteins, mineral salts, and carbohydrates. Variety can be obtained by preparing these foods in plain or savoury dishes, but, of course, the more highly flavored the dish is the harder it is to digest, and the digestive system will rebel at any food that does not agree with it. Over cooking will destroy the value of food to the body, still the important thing is to be sure not to over eat, but give the system a fair chance to do its work, then the result will be the same as the youth before Nebuchadnezzar, he surpassed the others by ten score votes.

The women's session of the Congress concluded by a visit to the cake factory of Messrs. Ellis Bros., Franklin Street, Adelaide.

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## HINTS TO SUPPLIERS.

[By W. H. DOWNES, District Dairy Instructor, South-East.]

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### IMPORTANCE OF GOOD QUALITY CREAM.

During the last two months it has probably been noticed by cream suppliers that factories generally have been more strict in the grading of cream than was apparent during previous years. This was particularly noticeable during the export season. Although at the present time South Australia is in the position of being barely self-supporting with regard to choice butter, nevertheless there is a considerable surplus of inferior cream being delivered to the factories, which is probably accounted for to a great extent by the hotter weather being experienced and supplies of cream being smaller and held longer at the farm. In order that our local choice butter may be in the



position to successfully compete with imported butters from a quality standpoint, it will be essential that the factories still continue to grade the cream and pay for it according to quality. All factories in this respect will be alike, and it follows that should a supplier leave a factory and send elsewhere in view of having his cream graded lower than choice, he may expect similar grading at the next factory to which he sends, unless, of course, the quality of his produce has improved. With the rapid approach of warmer weather conditions, it will be more difficult for some suppliers to consistently receive top grade prices for their cream unless they adopt the necessary measures to ensure that their produce is of reasonably sound quality. The chief faults noticed in the quality of local cream are mainly from a flavor point of view, and are as follows:—

*Stale Flavor.*—Due to keeping cream too long before delivering to the factory, and sometimes bordering on the rancid stage.

*Sour or Over-ripe.*—Due to the presence of too much lactic acid in cream. Warm conditions, low test, combined with age, are all factors tending to increase this trouble. In the course of time a stale and cheesy flavor will usually develop.

*Fermented Flavor.*—May be due to various causes, the chief of which are as follows:—

- (a) Cream kept too long, not in the best surroundings, particularly when it is low in butterfat test.
- (b) Mixing together cream of different temperatures before the warmest has cooled sufficiently.
- (c) Using a separator twice a day, and only washing it once daily, or not scalding the separator parts properly.
- (d) Keeping afternoon milking overnight and heating it up the following morning for the purpose of separating.

*Tallowy Flavor.*—This is a chemical flavor most common during summer months, which can usually be associated with cream of exceptionally high butterfat test. It develops as a result of exposure to heat, or through becoming air dried, and becomes more pronounced with age.

*Metallic Flavor.*—This is another chemical reaction which is usually, though not always, associated with cream of too low a butterfat test. It is caused through the action of the lactic acid in the cream on metal with which it comes into contact. It will rarely occur if the separator parts and other utensils are well tinned and kept thoroughly clean, but once the tinning is defective, or is neglected as regards cleansing, this flavor will soon be noticeable.

It is possible for cream to possess a combination of two or more of the above-mentioned flavors, such as “stale and tallowy,” “sour and fermented,” &c., all depending upon the conditions under which it is produced, kept, and delivered.

*The importance of frequent delivery to the factory cannot be too greatly stressed, as it is the primary cause of most of the trouble noticed in locally delivered cream.*

The man who desires the best price for his produce will endeavor to keep the cream as cool as possible while it remains on the farm. During warm weather cooling down by any method, but preferably by means of a suitable cream cooler, will greatly enhance the keeping quality, as the bacterial development is considerably checked by reason of low temperatures. Stirring the cream two or three times daily will also assist in reducing any objectionable “feed” flavors that may be present. In all cases, cleanliness plays no small part in the quality of cream, and suppliers who are not in the habit of washing their separators each time they are used are strongly urged to do so.

Rinsing utensils in warm water alone is not conducive to satisfactory results. After being scrubbed and rinsed, all utensils should be thoroughly scalded with boiling water. This latter treatment will tend to eliminate many of the troubles cream is heir to, as it kills all germs which may remain on the utensils, and at the same time the heat ensures rapid drying, and thus prevents the possibility of further bacterial development.



## TOMATO DISEASES IN SOUTH AUSTRALIA AND HOW TO CONTROL THEM

with special reference to Glasshouse Tomato Culture.

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[By GEOFFREY SAMUEL, M.Sc., Plant Pathologist, Waite Agricultural  
Research Institute, University of Adelaide.]

[Continued from page 510, *Journal of Agriculture*, December, 1930.]

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### INSECT PESTS.

#### CUTWORMS.

*Description.*—Cutworms are about the first of the insect pests to worry the tomato-grower. However, it is plants put out into the field which suffer most, glasshouse plants being rarely troubled except occasionally in glasshouses on new ground. Cutworm damage is familiar to all growers. The young plants have their stems eaten through about ground level, and flop over and die. Very frequently the cutworm which caused the damage can be discovered if the soil is carefully turned over with a pocketknife round the roots of plants which have been eaten off the previous night. The grub is brown in color and curls round into a circle when disturbed.

*Control.*—The most important point in cutworm control is not to plant on land which has been left dirty and weedy. Where land is worked to its full capacity, with rotation of crops and clean cultivation of soil prior to sowing, cutworm damage will rarely be important. If cutworms are few in number they will be checked sufficiently by the lead arsenate spray advised for leaf-feeding caterpillars. If they are numerous the best remedy is to use a poison bait (see page 633).

#### GREEN CATERPILLARS.

*Description.*—Green caterpillars (grubs) of more than one species eat tomato leaves and bore into tomato stems and fruit. Affected stems will suddenly wilt, and the bore-hole of the grub is easily found at the bottom of the affected part. Fruit is frequently attacked at the stem-end, and drops from the plant, or a soft bacterial wet-rot follows on the grub injury, converting the fruit into a sloppy mess inside the skin.

The caterpillars hatch from small white eggs laid on the plant by moths. After feeding and growing to full size they usually leave the plant to pupate under the protection of rubbish lying on the soil. They then emerge as moths, which fly from plant to plant laying fresh eggs on the leaves and stems.

*Control.*—The control measure to adopt is spraying or dusting with arsenate of lead, but it is much more successful if used early as a preventive instead of being left till the caterpillars have already appeared. It is a good plan to spray the seedlings once in the seedbed, before the leaves have become too densely grown together, and then again soon after they have been set out. As the plants grow, further treatments will be required, and



arsenate dusts will probably be preferable to spray for these later treatments. Treatment in the early stages is easier and cheaper, and will prevent a great deal of multiplication of the pest; it does not then become bad in the later stages as it frequently does when neglected earlier.

#### GREEN APHIS.

*Description.*—Green aphid are so well known that a description of these insects is scarcely necessary. They are usually to be found on the undersides of tomato leaves, or clustered on the young tissue near the growing point of the stem. They suck the juices of the plants, and when numerous they seriously reduce its vitality. They also excrete a sweet liquid, "honeydew," which makes the plant sticky and on which a blackish mould fungus may grow if the insects are very numerous.

Green aphid give birth to living young, and the colony of young ones produced by an adult wingless aphid can frequently be seen clustering round her. No fertilisation by a male is necessary at this stage, and it is only the winged forms appearing mainly at the end of the season which produce the sexual forms that provide for the carrying on of the species over the winter by means of eggs. During the course of their growth aphid shed their skins several times, and in a colony of any size the empty white skins which have been shed can always be seen among the insects.

*Control.*—Control of aphid is best obtained by nicotine and soap sprays or by nicotine-containing dusts. In glasshouse work the dust is most convenient, but the temperature must be above 76° for satisfactory results. In fact, the warmer the better, for the nicotine vaporises more quickly and strongly at the higher temperatures. Dusting with nicotine dusts is therefore best done during the warmest part of the day.

#### THE WHITE FLY.

*Description.*—The white fly, the scientific name of which is *Trialeurodes vaporariorum*, is a well-known pest of glasshouse tomatoes and can cause considerable damage if allowed to multiply unchecked. Even if it does not become bad enough to injure the plants, it may cause considerable trouble by necessitating the wiping of all the fruit.

Three stages of the insect should be recognised by the tomato grower. The egg is a very small white object, hardly visible to the naked eye, fixed to the under side of the leaf by a short stalk; it becomes gradually darker with age, and finally becomes almost black. This stage lasts from eight to 25 days, usually hatching in about 17 to 21 days.

The egg hatches to a small oval scale, which soon settles down to feed on the leaf, sucking the sap and not moving further during this stage of its life. The whitish oval scales are often to be found in large numbers on the under sides of the leaves, and when once known cannot be mistaken. The skin of the scale is cast three times during its growth, and at the end it develops a waxy covering, becomes thicker, and is at a stage corresponding to the pupa of other insects. The winged fly is developing inside this waxy casing, and emerges as the fully formed adult about three to six weeks after hatching from the egg, according to the temperature.

The fragile white adult flies are well-known, flitting about the houses, and live for several weeks. The females may lay from four to seven eggs per day throughout life. During both the scale and the adult stage a syrupy liquid is sprayed out by the insects, which falls on the foliage and fruit and makes them sticky. Often a sooty-mould fungus grows in this



sugary liquid, so that a black mouldy growth covers the plants, and may cause them to become unhealthy by blocking up their breathing pores, and reducing the amount of light falling on the leaves.

The white fly will live on many other plants than tomatoes, and is often especially troublesome on beans. It may therefore be found advisable not to plant beans between the houses.

*Control.*—The white fly is comparatively easily controlled by fumigating with cyanide, but because of the very poisonous nature of the gas a number of growers are afraid to use it. If the instructions are carefully followed, however, there is no danger, and it gives excellent control of the pest.

Control by nicotine dusts can now be done fairly effectively when dusts with the higher percentages of nicotine are used. There is always a danger that many of the flies may be just driven out of the houses before they are killed, however, and, although stupefied for some time, may later recover and regain the plants. If dusting with nicotine is preferred, the treatments should be done at the same intervals as are mentioned below under the heading, "Two fumigations necessary."

Still another way of controlling the white fly is now being tried in England and that is by the introduction of a minute parasitic wasp (*Encarsia formosa*) which parasitises the young scales under the leaves. Very encouraging results were secured in 1928, when some hundreds of thousands of parasitised scales were distributed to growers, many of whom reported complete control of white fly when the wasp was introduced into the houses. Efforts will be made to see if this beneficial insect can be established in South Australia, and thus save the trouble of constant fumigation.

As yet, however, the best and cheapest method for controlling the white fly is cyanide fumigation. A full description of how to do it follows, and this should be read very carefully, and followed in every detail by those who are trying it for the first time. They will find, after doing it once or twice, that the process is so easy that at future times they will have no hesitation in always fumigating with cyanide for the control of the white fly pest.

#### CONDITIONS FOR FUMIGATION.

Fumigation must always be done at night, while the breathing-pores of the plants are closed. It is also advisable to have the plants slightly in need of water, but not so much, of course, that they show signs of wilting. As regards the weather, the only really necessary point is to see that it is not too windy a night, for the type of glasshouse used here is not well closed, and on windy nights the gas would blow out too quickly. It is also better to choose a cool night than a warm one.

#### MATERIALS REQUIRED.

The fumigation is done by dropping carefully weighed quantities of cyanide into small earthenware jars, or glass jam jars, containing measured quantities of water and sulphuric acid, spaced at equal intervals along a centre row of the house.

Glazed earthenware jars about 6in. high can be bought quite cheaply, and about six jars are necessary for every 100ft. of the usual sized tomato house around Adelaide. The method of calculating the number of jars required is described in more detail on the next page.



A measuring glass graduated in ounces, which can be bought at any chemist's or photographer's shop, is used to measure out the water and acid into the jars. The materials are used in the proportions: water, 3oz.; sulphuric acid,  $1\frac{1}{2}$ oz.; sodium cyanide, 1oz. For the size of tomato house usual round Adelaide, 1oz. of cyanide per jar gives a good distribution of gas, so that the preparation of the pots of acid is simple. Three ounces of water are first measured out into all the jars, and then  $1\frac{1}{2}$ oz. of concentrated sulphuric acid (oil of vitriol) are measured out and poured into the water in each jar. The liquid becomes very hot, and care must be taken always to pour the acid into the water, and never water into acid.

The sodium cyanide is weighed out carefully into ounce lots, and each wrapped up in a piece of paper. A small pair of letter scales is advisable for accurate weighing. If lumps of cyanide have to be broken up, do it in a tin or box, so that pieces of cyanide do not become scattered around. Remember that it is very poisonous, and have all tins or other containers labelled cyanide poison and placed out of reach of children and animals. It should always be kept in a closed tin, as it gradually deteriorates in air. It might be possible to buy the cyanide already weighed out in packets. If potassium cyanide is used, 1oz. of sulphuric acid instead of  $1\frac{1}{2}$ oz. is sufficient.

#### MEASUREMENT OF HOUSES.

The amount of cyanide necessary must be carefully calculated according to the volume of the house. The number of cubic feet in a house is calculated by multiplying the length by the breadth by the average height. The average height is found by adding the height of the ridge pole to the height at the sides, and dividing by two. The following is an example of the calculation:—

Find the volume of a house 100ft. long, 15ft. wide, 4ft. high at the sides, and 7ft. at the ridge pole.

$$\text{Average height} = \frac{1}{2} (7 + 4) = 5\frac{1}{2}.$$

$$\text{Volume} = 100 \times 15 \times 5\frac{1}{2} = 8,250, \text{ say } 8,000 \text{ cub. ft.}$$

To cyanide at the rate of 1oz. per 1,000 cub. ft. would need 8oz. of cyanide, which could be used in eight 1oz. packets dropped in eight jars spaced equally along the centre rows of the house.

To cyanide at the rate of only  $\frac{3}{4}$ oz. per 1,000 cub. ft. would need only 6oz. of cyanide, which could be used either in six pots with 1oz. each, or in eight pots with  $\frac{3}{4}$ oz. each.

#### STRENGTH OF FUMIGATION.

The glasshouses used in Europe, which are constructed for artificial heating, are much more air-tight than the houses used round Adelaide, and smaller doses of cyanide, often only  $\frac{1}{4}$ oz. per 1,000 cub. ft. are quite sufficient. With the big gaps along the ridge pole and at the sides of our houses, however, a somewhat larger dose is necessary to be effective. For the grower trying fumigation for the first time, it is recommended that he try the effect of a dose of  $\frac{1}{4}$ oz. per 1,000 cub. ft. first, and if that is found not to kill all the flies and not harm the plants at all, he can increase the dose next time to  $\frac{3}{4}$ oz. per 1,000 cub. ft. Houses vary in air-tightness, and for many this rate will probably prove sufficient, but for other houses, which are poorly closed, 1oz. per 1,000 cub. ft. will not be too strong. Each grower can soon find out for himself the best strength of fumigation for his own houses.



Having seen that the plants are a little on the dry side, and that the night will not be too windy, the pots of water and acid are prepared and set along the houses at equal intervals down one of the centre rows during the late afternoon. The pots nearest the door at each end can be a little closer to the door than the spaces between the pots down the centre to make up for leakage at the ends. The pots will usually be about the width of the house apart. If a very wide house had to be done, two rows of pots might be necessary, in which case two people would be required for the dropping in of the cyanide.

The packets of cyanide are best kept together until just before fumigation begins, which should not be until about an hour after sunset, when it is just getting dark. They may then be either placed along one beside

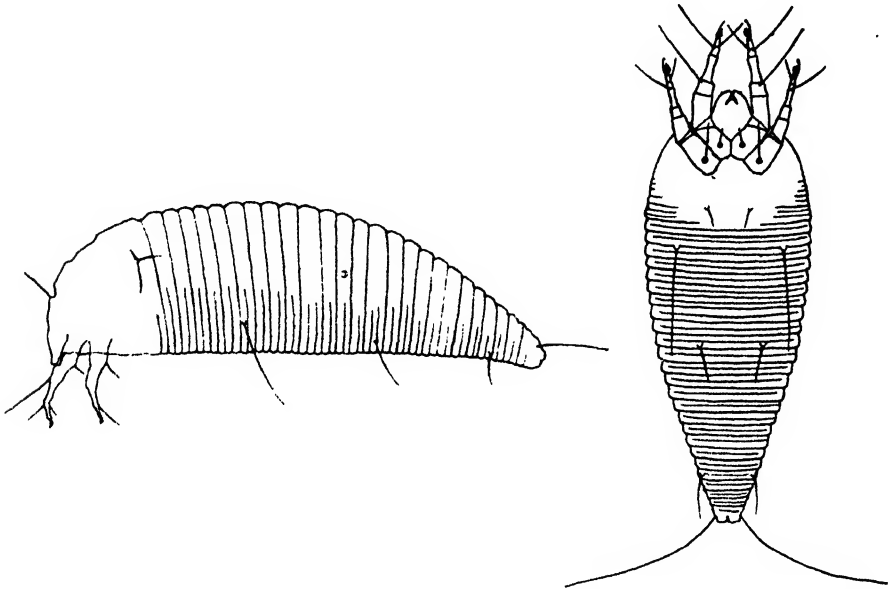


FIG. 33.—The Brown Surface Mite, *Phyllocoptes lycopersici*, so small that it is just invisible to the naked eye. This mite crawls over the surface of tomato stems and leaves in great numbers, and produces a rusty-colored discoloration and shrivelling of the leaves, working from below upwards.

#### DOING THE FUMIGATION.

each pot of acid ready to unwrap and tip in, or they may be carried along all together in a bucket or bag slung over the shoulder, and one unwrapped as the operator is walking along to each pot, and the cyanide dropped quickly in.

In all cases, the tipping in of the cyanide into the pots of acid should begin at the end farthest from the door, and the operator walk steadily towards the door, tipping the cyanide out of its packet quickly into each pot as he comes to it. He should then close the door and allow no one to go into the house.

The house must be opened and ventilated at dawn in the morning, for if sunlight comes into the house while the gas is still present, the plants are liable to be injured. Open the doors and remove a pane of glass at intervals along the sides to allow the gas to escape, and do not go into the house for a few hours until you are sure that the gas has had time to escape.



The pots should then be picked up and rinsed out carefully into a sink or into a hole in the ground which is filled in immediately. The house may then be closed again, and a watering given if necessary.

#### TWO FUMIGATIONS NECESSARY.

Fumigation kills only the adult white flies and the scales feeding on the under sides of the leaves. It does not kill the eggs, and so a second fumigation has to follow after all the eggs have hatched, but before any have grown to adults and started laying further eggs. The time of this second fumigation depends upon the weather. In hot weather (average temperature in house above 72°) it should follow a fortnight after the first; in medium warm weather (65°-72°) it should not be done for three weeks; and in cold weather (below 65°) only after nearly four weeks. Two fumigations properly done should control the white fly for the whole of the season, provided that white fly are not present on beans or other plants just outside the houses.

Seedlings and young plants in a sappy condition will not stand fumigation to the same extent as older plants which have been topped and which can be allowed to become a little dry before treatment. If it is necessary to fumigate young plants, the dose should be reduced a little. It is evident therefore that the grower who keeps his houses clean, and who is free from white fly during the early months of growth, will have a great advantage over his neighbor who has to fumigate while his plants are still young and sappy.

#### THE BROWN SURFACE MITE.

*Description.*—This disease is frequently called “golden stem.” It usually commences as a discoloration on the stem of the plant, which may sometimes be rather “golden” in appearance, but is usually more dull bronze or rusty brown. The trouble spreads out on to the leaves, which first become rusty brown and then gradually shrivel and die. The disease gradually spreads upwards, working along the stem and out on to the leaves, and finally the whole plant may become shrivelled with only the topmost leaves green, and even these beginning to show the characteristic diffuse bronze appearance of the early stages of attack. The fruit is sometimes affected, becoming bronze in color, and with the surface broken up into innumerable little corky cracks in a fine network.

*Cause.*—The trouble is caused by a minute insect (*Phyllocoptes lycopersici*) belonging to the class of “mites” (Fig. 33). The mites are about one two-hundredth of an inch in length, and so are just invisible to the naked eye except under the most favorable circumstances. They feed and multiply entirely on the surface of the plant, and wherever they are present in any numbers they cause the rusty discoloration. The gradual spread of this discoloration up the stem and out on to the leaves is thus due to the crawling of the mites in great numbers over the surface.

*Control.*—The best control measure is to dust with the finest sulphur dust. Since the mites are soft-bodied and entirely on the surface of the plant, this is one of the most easily controlled diseases. Guard against spreading the trouble from the affected plants to healthy ones by pruning or rubbing against diseased leaves while picking, before they have been dusted with sulphur. Nicotine-containing dusts or sprays are also effective.



## EELWORMS.

*Description*—Although not insects in the true sense of the word, eelworms can conveniently be considered here. They are very minute little worms, invisible or only just visible to the naked eye. They penetrate into the roots of tomato and many other plants, and live most of their life feeding inside on the tissues of the root. The irritation which their presence causes to the plant leads to the formation of knobby swellings on the roots, and when the worms are very abundant these can be so numerous that the whole of the root is thick, swollen, and clubby (Figs 34, 35). In fact, the name "club-root" is sometimes used by tomato growers for this disease.

The presence of the eelworms is usually not suspected until it is seen that there is something wrong with the top of the plant. The plant loses vigor, the fruit fails to set, the leaves are a paler green than normal, and finally become sickly and yellowish.



FIG. 34.—Eelworm lumps on glasshouse tomato roots.

The eelworms in the roots penetrate the tissues in all directions, the females are fertilised by the males, and the eggs then begin developing inside the female body. As many as 500 eggs may be laid by a single female. When the young hatch they may penetrate further into the roots or escape into the soil, where they may swim or be carried in water for some distance and later penetrate fresh young roots.

Eelworms are usually more troublesome in sandy soils. Once soils are infected it is extremely difficult to get rid of the pest, for the eggs can last over the season when there are no plants growing, and the worms can live on the roots of many species of cultivated plants.

*Control*.—Once again, steam sterilisation is the most practical cure for eelworms in glasshouse soil, but unfortunately is not yet available for glasshouse growers in South Australia. The usual remedy practised here is simply to move the glasshouse to fresh soil when the ground becomes badly infected.



A number of chemical treatments have been tried against eelworms with varying measures of success. The grower who notices eelworm infection in a comparatively small patch of his glasshouse may like to make an attempt to eradicate the pest by one of these methods before it spreads through the whole of his house. As soon as the infection is noticed it would be advisable to mark off the area and not allow the water to run across the patch all down the rest of the house if this is possible. The affected plants should be pulled up and the roots burnt as soon as the plants are unprofitable, but the treatment of the soil would best be left until the rest of the house has been pulled out.

Perhaps the most promising treatment to experiment with is the one using calcium cyanamide (Cyanogas). Briefly, the procedure is as follows:—Cyanamide is applied at the rate of 1 ton to the acre ( $\frac{1}{2}$  lb. per square yard) and carefully and uniformly mixed with the dry soil to a depth of 6 inches or more. The soil is then thoroughly irrigated. The treatment should precede the planting of the crop by at least six or eight weeks, during which time the soil should be frequently stirred to break up any crust which may form. The action is essentially a cyanide fumigation, and the residue finally left in the soil is only lime. The efficacy of this remedy has not yet been thoroughly proved under South Australian conditions, however, for it appears to have been used only on rare occasions so far.

#### CURCULIO BEETLES.

*Description.*—Occasionally tomato plants are attacked by Curculio beetles. These beetles live under the soil during the day time and come up and feed on the plants at night. They can usually be found by carefully turning up the soil at the base of affected plants with a pocketknife. They are small brown beetles, somewhat less than  $\frac{1}{2}$  in. long, which usually sham dead when disturbed. They nearly always feed at the edges of the leaves, so that if leaves are seen with the edges all irregularly eaten the Curculio beetle should be suspected.

*Control.*—This beetle can be controlled by arsenate sprays or dusts or by poison baits, as described for green caterpillars and cutworms.

#### SOME DISEASES NOT IN SOUTH AUSTRALIA.

Although nearly 20 diseases affecting tomatoes in South Australia have been described, there are a number of others which have not been found here. Perhaps the most important to mention are Fusarium wilt, and the late-blight or Irish blight which also affects potatoes, for both these diseases are present in other parts of Australia, and may very likely be found here also if favorable weather conditions were experienced.

Fusarium wilt has already been discussed on page 499, December, 1930, issue. Late-blight, caused by the fungus *Phytophthora infestans*, is only troublesome under fairly continuous warm, damp, and muggy conditions, such as are rarely experienced in South Australia. The symptoms consist of rapidly spreading rotten patches on leaves and fruit. Control measures consist of spraying with Bordeaux mixture, combined with general methods, such as rotation of crops (without potatoes), destruction of diseased material after harvest, etc.

As a matter of interest the following other tomato diseases which at times cause appreciable losses in other countries may be mentioned:—

Anthracnose (*Colletotrichum phomoides*).

Ascochyta blight (*Didymella lycopersici*).

Bacterial spot (*Bacterium vesicatorium*).



Buckeye rot (*Phytophthora parasitica*).

Botrytis stem-rot (*Botrytis* sp.).

Leaf mould (*Cladosporium fulvum*).

Sclerotium blight (*Sclerotium rolfsii*).

Western yellow blight (virus of sugar-beet curly top).

Although some of these, if introduced into South Australia, would probably never become troublesome, owing to the climatic conditions being unfavorable to them (as is the case with the late-blight mentioned above), there are others, such as Leaf Mould, which are certainly to be feared, and it is to be hoped that our quarantine laws succeed in keeping such diseases out of this State for as long a time as possible.

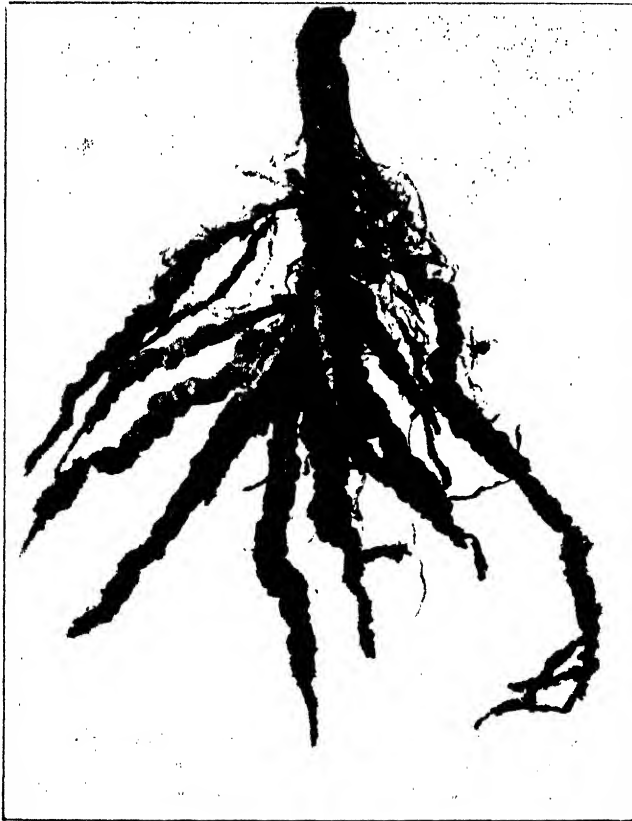


FIG. 35.-- Bad Eelworm swellings on the roots of a field tomato plant.

## FUNGICIDES AND INSECTICIDES.

### CHESHUNT COMPOUND.

#### *For Checking Damping-off and Root-rot in Seedlings.*

The mixture is prepared by mixing finely powdered copper sulphate and ammonium carbonate in the proportion of 2oz. of the former to 11oz. of the latter. Ammonium carbonate is in hard lumps, which are rather difficult for the tomato grower to reduce to a fine powder, so that many will find it most convenient to have the mixture made up by a chemist. The dry mixture should be stored in a stoppered glass or stone jar for at least



24 hours before using, and is then prepared for use by dissolving 1oz. of the dry mixture in a little hot water and adding to 2galls. of water. (The solution must not be placed in metal vessels.)

Cheshunt Compound was developed by Dr. W. F. Bewley at the Experimental and Research Station of the Nursery and Market Garden Industries' Development Society, at Cheshunt, in England. It was developed especially to control damping-off fungi in seedboxes. The solution does no harm to the plants (it is advisable not to let it touch the foliage, however, and to hose down with water immediately should any get on the leaves), but it is able to kill damping-off fungi in the soil. In England seedboxes are watered with the solution after sowing, and seedlings after transplanting. In South Australia, with our greater freedom from damping-off troubles, this would rarely be necessary. If seedlings are actually falling over from damping-off, however, Cheshunt Compound should be watered on immediately to prevent the disease spreading to still healthy plants, and it would be advisable to use it again in transplanting.

Cheshunt Compound is always of value where seedlings have to be replaced in the houses because of some root disease.

In the words of Dr. Bewley, "In replacing diseased individuals in the houses the method should be to remove the affected plant, water the hole with a pint of solution, replant with a healthy individual, and again water with the solution."

#### SOIL STERILISATION BY FORMALIN.

##### *For Control of "Damping-off" in Seedbeds.*

Formalin is too expensive to use for soil sterilisation on a large scale, and its use is thus limited to seedbed sterilisation. Here also its use is not likely to be great for some time to come, since the soil of seedbeds can be replaced comparatively cheaply near Adelaide, and soil can be obtained which is practically free from damping-off fungi. There may be occasions, however, on which a grower would like to sterilise his seedbeds thoroughly after some disease has been present, and so the following instructions may be given.

The formalin is used at the strength of 1lb. to 15galls. of water, and the soil is thoroughly soaked with this solution at the rate of about a gallon to each square foot. The soil is then covered with bags for 24 hours, and the bags then removed and the soil aired for at least a week before planting. It is advisable also to sterilise spades, forks, &c., by washing with the solution while there is some made up.

Formalin is a much more powerful disinfectant than Cheshunt Compound, and, therefore, cannot be used once plants are growing in the soil. It can be guaranteed to render soil free from disease, but precautions must be taken that no further disease is introduced in water, on tools, or in any other way.

#### SOIL STERILISATION BY STEAM.

See the article by Dr. W. F. Bewley on "Practical Soil Sterilisation by Heat for Glasshouse Crops" in the *Journal of the Ministry of Agriculture*, Gr. Britain, vol. 33, page 297, July, 1926, or U.S. Dept. Agric., Farmers' Buls., 996 and 1320.



## BORDEAUX MIXTURE.

*For Control of Fungus Diseases of the Leaves.*

Bordeaux Mixture has been largely replaced in glasshouse tomato growing by copper-lime dust, which is really almost a dry Bordeaux dust. These fungicides are the best for checking the spread of Leaf-spot and Early Blight, but since neither disease is widespread in South Australian glasshouses there is no general need yet for copper-containing fungicides in glasshouse work here. Tests will have to be made later on the relative efficiency of Bordeaux Mixture and the copper-lime dust in checking Early Blight under our conditions, and any grower whose plants are suffering from Early Blight might well compare the two treatments.

Bordeaux Mixture is made of—

4lbs. copper sulphate (bluestone).

4lbs. lime (fresh and good quality).

50galls. water (rainwater, or good quality).

This mixture (4-4-50) is somewhat weaker than the standard (6-4-50) which is often used on outdoor plants. The copper sulphate dissolves most easily when tied in a bag and suspended near the top of the water, or it may be dissolved in a jug of warm water and then stirred into the cold. The lime should be gradually slaked and stirred into an even paste and then diluted to a milky fluid. The best Bordeaux mixture is made when the bluestone and lime solutions are equal in amount (in two non-metal vessels, e.g., small barrels) and are run simultaneously into a third lower vessel (a larger barrel) through a fine brass wire or muslin sieve. Under these conditions the mixture forms the finest possible precipitate which will remain in suspension well while spraying. It should be sky-blue in color, and not green, and it should not deposit any copper on the blade of a bright pocket knife dipped into the solution.

## NICOTINE-SOAP SPRAY.

For the control of tomato spotted wilt, in order to kill the black carnation thrips on seedlings in the seedbed or on plants not long put out, it may be found preferable to use a nicotine-soap spray instead of a dust, since at the time of year the temperature is scarcely high enough to vaporise dusts well.

The nicotine-containing sprays on the market are either extracts of tobacco plants containing pure nicotine, or a 40 per cent. solution of the chemical compound nicotine sulphate, as in Black Leaf 40. Full directions for use are usually given on the containers. It is advisable always to use soap with these sprays and to make them up with rainwater if possible. Thrips need fairly strong solutions to kill them, and a 1 in 800 solution of Black Leaf 40 is the weakest which will be effective. Some growers have used 1 in 500 with no damage to plants, and better results.

## DUSTS.

Dusts are widely used in glasshouses now in preference to sprays, for the conditions are almost ideal for their application. The absence of wind means that the cloud of dust hangs in the air round the plants and deposits a fine film of the fungicide or insecticide all over the surface, reaching positions in a fairly dense foliage where it would be almost impossible to get a spray. This is most important, for the whole principle of applying a fungicide is to cover the healthy plant completely with a poisonous



coating, which will kill any fungus spores which germinate on the surface. Similarly, in the case of an insecticidal dust such as an arsenate, a covering must be put over the whole plant so that wherever the young caterpillar hatches from the egg and begins to feed it will be unable to eat the leaf without eating some arsenate as well.

All the dust manufacturing companies now supply combination dusts, containing both fungicidal and insecticidal substances. Copper and sulphur are the chemicals used against fungus diseases; an arsenate is the chemical used against chewing insects; and nicotine the chemical against sucking insects (*see page 622*). Combining them all makes a dust which is of value against all above-ground pests and which is very little trouble to apply. A number of growers dust regularly with one of these proprietary dusts as an insurance against disease, and this is probably the safest method for the grower who does not feel confident that he can quickly detect diseases.

Dusts are by no means inexpensive, however, and the man who knows his diseases well and who is also careful in removing diseased plants can save money by dusting less frequently. *Under our conditions at least two treatments are usually necessary for the proper control of green caterpillars. One of these should be soon after the seedlings are established in the houses, and the second just before the flowers on the first truss open. It is quite a good plan to make these two standard dustings, and to use a combination arsenate-nicotine-sulphur dust (or a proprietary "tomato dust," which contains copper in addition and is slightly more expensive).* These two treatments should greatly reduce the chance of any pest multiplying up during the season, provided the houses and their surroundings are kept properly clean.

It is not suggested, however, that the grower should *rely* on these two dustings to keep his plants clean. He must be continually on the watch for fungus diseases or insect pests, and immediately apply a dust if one is seen to be spreading. In such a case there is no need always to use the most expensive combination dust, however. It may be that caterpillars are the only pest which is not being controlled, and a plain arsenate dust would be the logical dust to apply. Even when two or more pests are multiplying a suitable combination dust to control both of them can always be chosen from the trade catalogues. A few examples may make these points clearer. Should a grower notice a few plants infected with the Brown Surface Mite (Golden Stem) he would immediately get the dust gun and dust these few plants and a few surrounding with sulphur, for this pest is easily killed with sulphur, and it can scarcely spread through the house at all unless it is carried on the hands or the clothes of workers. Should there be noticed a number of plants with the dark spots of Early Blight on the leaves, however, the grower would first go along and nip off affected leaflets and take them out and destroy them, and then dust the whole house with a copper-lime dust. Dusting the whole house is advisable in the case of Early Blight, for fungus spores are so light that they can spread in air currents. Had aphids been noticed on some of the plants at the same time as Early Blight it would have been advisable to use a copper plus nicotine dust instead of a copper alone. These are just a few examples of how dusts can be chosen to suit each particular case. The correct dust to use for each pest (provided that a dust will be of use) can be found in the paragraph on Control which follows the description of each particular disease.

One or two cases have come under notice where the application of a copper dust at flowering time has affected the setting of the fruit. Further



investigation will be required to determine under what conditions this may occur. Another point which needs investigation is the relative merits of copper carbonate and copper-lime (bluestone and lime) dusts under the conditions in our glasshouses. Some of the proprietary copper-containing dusts contain their copper only in the form of copper carbonate; and this may not prove to be as efficient a fungicide as the copper-lime. At all events, for the present, if a fungicidal dust is needed it is suggested that preference be given to the copper-lime dust, and that it be not applied at the time of maximum flowering of any truss, if this can be avoided.

#### FUMIGATION WITH CYANIDE.

See page 622 (Control of White Fly).

#### POISON BAITS FOR CUTWORMS, ETC.

There are numerous formulas for poison bait. They all contain an arsenic poison such as Paris green, white arsenic, or London purple mixed with a bulky substance such as bran or slack lime, and with a sweetening or attractive substance such as sugar, molasses, oranges or lemons, or amyl acetate added.

A typical formula is as follows:—

Bran, 20lbs.

Paris green, 1lb.

Treacle, 2qts.

Five finely chopped oranges or lemons, or  $\frac{1}{2}$ oz. amyl acetate.

Water, 3galls.

The Paris green is thoroughly mixed with the bran first, and then the whole moistened to the desired degree with the sweetening mixture. If the bait is to be spread over a large area it is preferable to have it almost dry and sprinkle it along the rows of plants. About 6lbs. per acre is all that is required for outdoor use where the plants are 3ft. apart.

#### CLEANSING THE GLASSHOUSE AT THE END OF THE SEASON.

Especially after a fungus or insect pest has been prevalent it is desirable to thoroughly cleanse the glasshouse at the end of the season. Some growers burn sulphur in the houses, but while this is valuable it has not proved entirely satisfactory in all cases.

In England Dr. Bewley recommends the use of an emulsion of cresylic acid and soft soap. (This is practically a crude home-made Lysol). Dr. Bewley gives the following directions for preparing the emulsion:—Pale straw-colored cresylic acid and pure potash soft soap are placed in a bucket at the rate of 1gall. of the former to 8lbs. of the latter. The bucket is then heated over a brisk fire until all the soap is completely dissolved, the process taking about 10 minutes to complete. This strong emulsion is used at the rate of about one part in 50 parts of water, *i.e.*, 1 pint in 6galls. The diluted emulsion is best applied with a strong power sprayer, and should be carefully directed into all cracks in the woodwork, and over the glass, the surface of the soil, in fact everywhere. The house should then be closed for several days, and later opened and aired for two weeks or more before planting. It is advisable to wear goggles and rubber gloves while spraying.

A simpler, but not quite so efficient, method is to spray with strong lime-sulphur solution instead.

(Concluded.)



## ERADICATION OF YACCA (*Xanthorrhoea Semiplana*.)

[By ROWLAND HILL, Agricultural Instructor.]

Throughout the South and South-East of this State, as well as on the lower end of Eyre Peninsula, there are tens of thousands of acres that could be developed as excellent pasture lands, providing the cost of clearing could be reduced. In many cases *Xanthorrhoea semiplana* (the low-growing yacca) has been responsible for the major portion of costs of clearing. In the South-East and South 30s. an acre has been the usual contract price for clearing the land of such growth by grubbing, and where the growth was exceptionally thick the cost has been considerably in advance of this figure.

When completed, the method of clearing by grubbing is not always satisfactory on account of the great depth of some plants and their liability to shoot again.



The type of Yacca being dealt with on Mr. F. J. Summers' Property at Back Valley.

Various methods of treating the yacca with the idea of cheapening the cost of eradication have been carried out, but the work done by Mr. F. J. Summers, of Back Valley, near Iuman Valley, in conjunction with the Vacuum Oil Company Proprietary Limited, is certainly outstanding at present. Accompanied by Mr. L. A. Wilde, of the Vacuum Oil Company, and Mr. W. L. Summers, Secretary to the Minister of Agriculture, I inspected these tests on Thursday, December 12th. Mr. F. J. Summers has every reason for being enthusiastic on the results he has obtained.

### TREATMENTS.

Pure Laurel kerosene, which can be purchased in 40gall. drums at 1s. 1½d. per gallon at the Adelaide depot, was used in all cases.

#### *Treatment A.*

This trial comprised an acre of scrub land which contained 960 yacca plants. With an old teapot, kerosene was poured into the heart of each plant on July 8th, 1930. The operation took one man two and a half hours, and 8galls. of kerosene were used.



The result was at least a 90 per cent. kill. The cost of treatment would be about 4s. 6d. per acre for labor and 10s. for 8galls. of kerosene, at, say, 1s. 3d. a gallon. The total cost would therefore be 14s. 6d. per acre under this method.

*Treatment B.*

On July 25th two additional acres were treated. One of these contained 401 yaccas and the other 409. The kerosene was applied in the same manner as in test A. No record of the time of labor expended was kept, but the quantity of kerosene used was 1½galls. for the two acres, whereas 8galls. were used to obtain the same result in test A with 960 yaccas, only 1½galls. were needed for two acres and 810 yaccas in this test. As the results in test B were equally as effective as in test A, it plainly shows that in the latter far more kerosene than necessary was used.



Mr. F. J. Summers with a tea pot and adze used for treating plants. He has in his hand the centre of a Yacca which has been easily pulled out three weeks after treatment.

*Treatment C.*

In this case all leaves were cut off level with the ground with an adze and the kerosene then applied. This saved much kerosene, as it could be easily directed to the correct spot. Cutting them off in this manner also acted as a guide, showing which yaccas had been treated. An area of three-quarters of an acre, containing 665 yaccas,



was cut and treated with kerosene by one man in two hours and twenty minutes on October 3rd. Four gallons of kerosene were used, and the result was 100 per cent killed. With kerosene at 1s. 3d. a gallon on the spot this method can be successfully carried out at the cost of 12s. per acre.



Yucca stumps lifted out by plough three weeks after treatment showing the hollow centre which has decomposed.

According to these tests, that in C is certainly to be recommended. The quantity of kerosene and time needed per acre will, of course, be governed by the number of yuccas present. From the results of treatment C it seems reasonable to accept the figure of 150 yuccas to 1gal. of kerosene, and the possibility of a man treating 240 to 300 yuccas an hour. This is certainly more effective than the grubbing method, and is only one-third of the cost.

Yuccas growing on sandy land were treated as in treatment C and ploughed three weeks later, with the result that all the yucca stumps turned up easily with the furrows, the centres being in a state of decomposition.

Mr. Sumners informed me that a mid-summer treatment would probably take more kerosene, because the sap is then rising and the plant harder to kill.

It was very noticeable that clover and other feed plants growing right against the treated yuccas had not been affected in any way by the kerosene applied to the yuccas.



## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

## FORTY-FIRST ANNUAL CONGRESS.

[Continued from page 498, *Journal of Agriculture*, December, 1930.]

[Papers read at the Men's Congress on Wednesday, September 17th, appear elsewhere in this issue.]

**Tuesday. September 16th.**

## CONSERVATION OF FODDER.

Mr. E. H. FISHER, of the Wasleys Branch, presented the following paper:—

A large number of farmers in South Australia do not give this very important matter due consideration from a farmer's business point of view. Farmers seem to think that when one drought has gone, no more will follow for some considerable time, but that is not so; history always repeats itself. And now that the present drought has broken, the time is opportune to put aside a reserve stack of hay. This in a bountiful year does not involve much expense, because when hay is plentiful it is cheap. The interest lost directly on that reserved stack while good years continue would not amount to many pounds, but the value of that amount of capital invested would be many times doubled when a drought occurred. I consider a stack of hay on hand a good "probate policy for a drought."

Of the hay fodders, we have wheaten hay which should be cut a little on the green side. Stock will then eat it more readily, and, when in the stack, mice will not touch it so much. Oaten hay should not be cut too green, because it has a tendency to be bitter. I do not recommend this as a reserve fodder, because if cut in the golden tinge and stacked, mice in a short time would destroy the whole stack. It should be put in the bottom of a wheaten stack and on no account used for roofing purposes.

Barley hay, preferably Cape barley, may be cut with advantage and put aside when too rank to be left for reaping for grain, and fed to stock, preferably loose.

## STOOKING.

I favor the "lying down" stook, which, if properly made, will keep out a considerable amount of rain. This method of stooking preserves the color and weight of the hay and makes the sheaves nice and flat for stacking. With 30 to 36 sheaves in a stook, placed butt to butt, it takes a fair amount of wind to disturb them.

A stack of sheaved straw is of great assistance in dry years. If properly stacked it will keep indefinitely without spoiling, and if mixed with good wheaten hay will materially augment the fodder supply of the farm.

## STACKING.

The site chosen for the stack should be on high land. First of all put down a good layer of straw about a foot thick all over the ground which will be the size of the stack. The shape matters very little; round end stacks are quicker to build on the ends than square corners, but square corners are better for opening and tying on the roof. When the shape and the size of the stack have been decided upon, go to the middle and stand the sheaves up the same as if a standing-up stook is to be made, and work that stook out until it is the size and shape of the stack. This prevents any of the heads of the sheaves from touching the ground. Build up the walls to about 16ft. to 18ft., keeping the middle of the stack not less than 3ft. higher than the walls. The roof should be built with butts on the outside filled in behind the heads out.



Another fodder that can be saved is "cocky chaff," and, if put in a heap and covered with a good coat of loose straw, will keep for many years. It can be fed with molasses and will make an appetising feed for stock in times of want.

#### ENSILAGE.

Last, but not least by any means, comes the fodder which I consider is absolutely essential for a dairying district and which can be of great assistance in many ways to any farmer, and that is ensilage. Ensilage is the cheapest form of reserve fodder available, because when crops are too rank, especially stack yards where manure has been spread, the crop can be cut in its green stage and yield about 6 tons to 10 tons to the acre, but if left for hay would not be worth much. Over 90 per cent. of farmers in the past have not given this fodder any consideration. I think this is so because they do not know the value of its succulent qualities. It has many advantages over other fodders; it can be kept indefinitely for years and come out of the silo equally as good as when put in. This cannot be said of other fodders, because the longer they are kept the more they deteriorate, and there is no loss with fire. In dry years, high prices tempt farmers to sell as much hay as they can, but this is not the case with ensilage. It does not command a ready sale on the farm, therefore the stock benefit, and they relish ensilage in the summer months of the year because its succulence is as good as green feed. It is just as good for mares with foals, ewes with lambs, and sows with suckers for producing milk for their young as it is for dairy cows giving milk.

There are several ways of storing this fodder. The methods are silos built above the ground, stack ensilage, and pit ensilage. I consider the pit method the cheapest, especially if an underground tank or two is available. Chaffed up it can be taken out as required with ease in bags. After the tank has been filled, it is necessary to put loose straw and heavy weights on top to exclude all air. Finally, the pit should be covered with a roof to keep out the wet, as rain spoils any form of fodder.

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#### Wednesday, September 17th—Morning Session.

##### WHEAT GROWING.

Mr. H. G. FISHER (Tatiara) contributed the following paper:—

In these days of high cost of production the farmer must get good yields to make wheatgrowing pay, especially on the better class of soils, and this is the land my paper refers to mainly. Nothing should be left to chance. The land we intend fallowing for wheat should be in a good fertile condition to produce a good crop; if not, it should be sown to oats or peas or top dressed heavily and left to pasture or sown to Subterranean clover in the districts with good rainfall, to enrich it for the coming wheat crop. My experience in working land extends over 28 years. The soil is of a loamy character and is farmed on the three-course system (fallow-wheat-oats) with an occasional year to pasture and a crop of barley grown in place of oats after a few years. The oat crop sown on the burnt wheat stubble ground has been as payable as the wheat crop, considering the less work that it takes. Of course, our district has the benefit of the Melbourne market, which is always about 6d. a bushel above Adelaide prices. Growing oats helps to keep the land free from take-all.

Our Agricultural Instructors recommend a system very similar to the one I have worked on for years and find it works out in practice very well. I would like to point out that oat crops in this locality are not so good as they were in the earlier cropping periods. They do not appear to be obtaining just what they need from ordinary superphosphate dressing, and we are now waiting for the scientist to come along and tell us what they need. Only by the scientist and the farmer working together can we ever hope to get the best from our land. While the oat crops have not been so good, the wheat crops have yielded more on this system. Last year one of our paddocks averaged



between 14 and 15 bags per acre after being cropped on the three-course rotation for the last 25 years, and the whole wheat crop of between 300 and 400 acres averaged 36bush. per acre. This serves to prove that, acting on advice from our Department of Agriculture, that a liberal dressing of super and fair working of the soil, the land will stand continuous cropping for a long period.

Some of the essentials of producing a good crop are fallow early, especially in the drier districts. For fallowing I favor the mouldboard plough, turning all grass and rubbish well under to decay; then leave the land lay for a few weeks if the weather is good, but if heavy rains fall it must not be left too long or it will set hard and not work up nice and even. The first cultivation must be fairly deep, practically to the bottom of the plough, which should be about 3½in. on average soils. This working deep at the first cultivation helps to break up the furrows and consolidate the seedbed. Also it hastens the germination of weed seeds, a great factor in producing a clean crop. The cultivators must be kept going when weeds appear above the surface, except in the driest of weather, when sheep will be found very beneficial to keep the fallow clean. Working the fallow when weeds are small retains the surface mulch and leaves the seedbed intact.

When the fallow is ready for sowing, go over it once more; it will always pay. As regards time of sowing, every farmer should know what has proved the best time in his district. Farmers should keep records of the date of sowing their crops and then they would have practical experience on their own particular farm and sow according to experience. My experience leads me to prefer a later sowing than the general rule, but if a farmer has low-lying land in the heavy rainfall districts, he must get it in early to get a good germination. Only sow deeply on those occasions when it becomes necessary to put down the seed into the moisture to get a good germination. Quantities—I recommend 75lbs. of graded seed and 150lbs. of super per acre on the good soils of our State with a fair rainfall. Sow the variety of wheat that has given the highest yields over a period of years in your own district. If sowing seed of your own crop, save it from the cleanest part and from wheat harvested in the middle of the day for preference, because in the morning the thresher is generally close down and the germination of the grain might be affected. Never sow any but the best of seed. If there is ball smut in the crop obtain fresh seed from the College or a farm you know, and order early.

Method of doing the Work.—Some people claim that tractors will beat horses; I doubt it. I have had experience on our farms where we work two eight-horse teams and a tractor, and I think the horses are the cheapest. The tractor can get over a vast amount of work just at a critical period, and makes farming more pleasant, one factor in stopping the drift to the city.

In conclusion, we should use our practical experience on our own particular farms, and, with the aid of the scientist and our Agricultural Instructors, I see no reason, in a fair season, why we should not be able to produce a good crop of wheat.

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### Wednesday Afternoon.

### FREE PARLIAMENT.

The following resolutions were carried:—

Mr. A. Smith (Bugle) moved and Mr. Ebsary (Bute) seconded—"That in view of the keen competition overseas, and in order to improve our standard of saleable wheat, we believe that the adoption of the system of branding of wheat bags similar to that in operation of Western Australia would prove advantageous to South Australian wheat growers."

"That we consider it advisable to introduce legislation similar to the Wheat Bags Act, 1928, now in operation in Western Australia, and that all wheat be marketed on grade instead of the present F.A.Q."



Mr. L. Dinning (Mundalla) moved and Mr. A. Ross (Mundalla) seconded—"That instructors of the Department of Agriculture be allowed to judge at country shows."

On the motion of Mr. H. Fisher (Tatiara), seconded by Mr. Butler ( ), it was decided—"That judges have power to award prizes in fallow competitions without taking moisture content."

Mr. Johnson (Yeelanna) moved, and Mr. M. Gardner (Koppio) seconded—"That representation be made to the Hon. Minister of Agriculture requesting that the Crop Competition subsidies be continued."

The following resolutions lapsed:—"That this Congress is in favor of awarding the State Cup for Crop Competition to the farmer who receives the highest points according to the rainfall during the growing season." "That the registration of bulls be abolished." "That the Crown Lands Department compel farmers in new land to leave three chains of standing green scrub on the south and east side of block or holding, if necessary passing legislation to give this effect." "That in the interests of economy all Bureau Conferences be abandoned for one year." "That at Conferences the agenda paper be strictly adhered to for time and subjects."

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## WOMEN'S SESSION.

### Tuesday Afternoon.

#### HOME NURSING.

Mrs. W. VARCOE (Millicent) read the following paper:—

No many women and girls nowadays are required to do some home nursing that a few hints here may be found helpful.

Keep your patient as far removed from kitchen odors as possible. Never wear creaking shoes or a rustling gown when caring for the sick. The home nurse should learn to take the patient's temperature, pulse, and respiration. The temperature of a person in normal condition is 98.25 degrees, and any deviation from this, either higher or lower, indicates that all is not as it should be. If the temperature is much higher or lower than it should be something is radically wrong. Any doctor will instruct the home nurse in the use of the clinical thermometer. Never take the temperature immediately after a sick person has taken either very hot or very cold liquids, as this prevents getting the correct degree; neither should the thermometer be used directly after a meal, as eating and drinking tend to elevate the temperature. Take it at about the same hour each day.

To count the pulse, place the tips of the fingers on the inner underside of the wrist, and when able to feel the pulsation of the artery plainly, count the beats for a minute—to yourself, of course. The normal pulse of the average adult is usually 72; though, in different people it may be as low as 60, or as high as 80, and yet be normal. In children the pulse beats much faster than in grown people.

In counting the respirations, do so without the knowledge of the patient, as to audibly count a person's breathing will render him incapable of doing so naturally. Normally the respirations are from 18 to 22 per minute, though these may vary, but if below 12 or above 30 there is serious trouble.

Do not allow the sick person to know just what temperature the clinical thermometer registers every time it is used. If the patient inquires, an evasive answer can easily be given if the nurse possesses tact.

Do not keep asking the patient how he or she feels, and never under any circumstances discuss the condition of an invalid in his presence, either by questioning the doctor or retailing the symptoms to anyone else. Do not be uncertain as to which medicine you administered last. If your memory is poor write it down, or the sick one



will worry as to your reliability in the handling of drugs. If you have anything to say to a person in the sick room other than the patient say it clearly, and never in the irritating half whisper that many use when talking to the sick.

In changing sheets on a bed, and this should be done daily if the patient is feverish, turn the patient on one side. Stand on the side away from the invalid. Fold the blanket and upper sheet carefully over on the patient. Pass to the other side of the bed, and roll the other sheet towards the invalid. Place the clean sheets on this side of the mattress, rolling the part that will go under the patient. Gently roll or assist the patient over to that side of the bed on to the clean sheet, and in this way the old sheet can be removed and the new sheet unrolled and put into place. If you can get assistance, let one person sit on the end of the bed and hold the patient while you shake the pillows and put on new covers. The change in posture often rests the patient.

In giving nourishment follow the advice of the attending physician closely and strictly. Where it is ordered every hour, or oftener, give on the minute, unless the patient is asleep when the time comes, in which event do not disturb him unless particularly ordered to do so, for sleep is nature's most potent remedy in many cases.

When a patient has so far convalesced as to require solid foods, do not trouble him with questions as to what he would like, but try to provide some little surprise at each meal, as this often stimulates the appetite. Remember that a quick, tepid soda bath, besides being wonderfully refreshing, will reduce the temperature of a feverish patient, and that after a nap, or to induce the same, sponging the hands or face in methylated spirits and water, turning the hot pillows or substituting fresh ones, gently brushing the hair, or stroking the hands slowly will often soothe and quiet.

Rest is as important for the nurse as the patient. She should manage to go out for a short walk every day for the air and change, and where there is more than one member of the family available the night should be divided into watches, that each nurse may get an undisturbed sleep of three or four hours. Whatever the illness, all superfluous articles of furniture or clothing should be banished from the sick room, that the air may be as fresh and sweet as possible. An open fireplace affords ideal ventilation, but lacking this a narrow board fitted into the lower part of the window answers very well—thus allowing the air to draw up between the two sashes without the danger of direct draught. No dishes, spoons, or glasses should be allowed to stand after being used. All dust should be removed from floor and furniture each morning by the use of a dampened cloth, wringing it out frequently in fresh water. Add to these rules tact, unlimited patience, and strict obedience to the doctor's orders, and you have a good chance to "pull" your patient through any ordinary illness.

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#### PREPARATION AND CURING OF BACON.

The following paper was read by Mrs. C. PHILLIS (Parilla):—

It is advisable to kill for bacon in the colder months of the year, and practically the whole of a pig can be used.

Let us assume that a pig of medium size, about 150lbs. to 200lbs. in weight, is killed and cleaned in the usual way, and is left to hang on the gallows for about 24 hours to set. A good chopper, a saw, and a sharp knife are required. There are two ways to saw the pig—first saw downwards, from the tail to nose; second, cut the bones each side of the backbone and take the whole of the backbone out in one piece. Cut off the head close behind the ears. Cut out the flat pieces of lard from the ribs. Saw off the trotters—hind ones just above the hocks and front ones just above the knee.



Cut off the hams, leaving the sides as long as possible for bacon. Cut off the shoulder close to the shoulder blades. Shape the hams and take out the bone to the socket, nicking off the socket knob with the saw. This helps to cure the bone of the ham. Bone the shoulder and leave it in one piece to cure as bacon, or cut it up into pieces of meat to pickle or roast. Cut out the rib bones from the bacon sides and level off the fleshy pieces of meat. These pieces can be used for sausages. This completes cutting up one half of the pig. Treat the other half in exactly the same manner.

#### CURING.

To make brine, obtain a clean pickling cask, and sprinkle a thick layer of salt in the bottom. Put into a pan about 6lbs. of salt, 3lbs. brown sugar, and  $\frac{1}{2}$ lb. saltpetre. Mix this well together and rub each piece of meat thoroughly with the mixture. Pack the meat into the cask, fleshy part upwards, and put the bacon sides on top of the other meat. Allow it to stand for about three days, then drain off the brine and turn the meat. Make another brine by filling a petrol tin bucket three parts full of water. Dissolve into it as much salt as will float a fresh egg. Add the brine previously taken off the meat and bring all to a boil, skim off any scum that may arise and allow to stand overnight until quite cold. Next day pour it over the meat, which should be turned over every day. The bacon should be left in the brine for about a fortnight, the hams a little longer. To dry, salt it and pack it away into suitable box, use the same salt and saltpetre and a little pepper and not so much brown sugar, say 1lb., as for making a brine. Rub each piece of meat thoroughly with the mixture. Lay in a box, fleshy part upwards, rubbing the meat about every three days. Leave in pickle for about a fortnight—hams a little longer. Then take them out and rinse off the brine in cold water and allow it to drain for a day or two.

To roll the bacon beat the sides out flat with a rolling pin and sprinkle a little sugar, pepper, and spice, if liked, over the meat side of the bacon. Then roll up tightly, using a buckled strap to keep it in position. Put several coils of strong bacon cord around the rolls, about 1 in. between each strand, and make half-hitches to keep the cord from slipping, and tie securely.

It is a good plan to rub over the bacon rolls and ham with olive oil to keep the rind soft, as it is easier for cutting. Sprinkle hams with a little pepper. Bacon and hams may be smoked in the usual way.

My method of dealing with the smallgoods is as follows:—Take the head of the pig and cut off the cheeks and tongue, rub these with salt and put them into the pickle; then chop the headbones into about six pieces, after taking out the eyes and chopping off the nose. Put them into a dish with salt and water and allow them to stand for a day, then make brawn by putting it into a saucepan with clean water to cover. Season with pepper and salt and thyme; boil until all the meat leaves the bones. Remove the bones and put the brawn into a basin to set. When cold it will be quite firm to cut. The brains are very nice fried. The trotters are usually put into the pickle, but may be added to the brawn. Thoroughly clean the sausage skins and put them into salt and water for about three days, changing the water each day. Mince all the pieces of meat that have been cut off when shaping the hams and bacon. Add the kidneys and heart and season with salt, pepper, and thyme and sage. Mix these ingredients well together, and fill the sausage skins; divide into lengths and fry in the pan. The lard must be rendered and put into a jar to set, covered over, and kept in a cool place. The ribs, neck, ham, shoulder bones, and backbone may be roasted or used in many ways.

Under the guidance of Mr. E. H. Fromen (Manager), delegates inspected the dairy and farm produce factory of the S.A. Farmers' Co-operative Union at Mile End.



## POULTRY EXPERT.

### APPOINTMENT OF MR. C. F. ANDERSON.

Mr. C. F. Anderson has recently been appointed to the position of Poultry Expert, after having held that office in an acting capacity since the retirement, in April last, of Mr. D. F. Laurie, with whose work he had been in close touch for a number of years. He received his first appointment in the Department of Agriculture in 1909, and in 1924 was appointed Manager of the Parafield Poultry Station and Assistant Poultry Expert. Under his charge, the Parafield Station was remodelled, and is now a modern poultry plant with an established business in the sale of fertile eggs and day-old chickens throughout the State. Prior to Mr. Anderson's appointment at Parafield, the day-old chicken trade was unknown in South Australia. The Parafield sales of this



class of chicken now amount to 12,000 a season, and besides this, the Station disposes of a similar number of fertile eggs. There is an average stock of 4,000 birds, and, in addition, a Single Test Egg-laying Competition is conducted there under Mr. Anderson's supervision.

Mr. Anderson considers that the rapid increase in our overseas egg exports is largely due to the systematic work and instruction of the Poultry Section of the Department. Commercial poultry farming has become an established business proposition in South Australia, and the export trade has doubled during the past twelve months.

For many years Mr. Anderson has been actively interested in the educational side of his work. The Parafield Station has afforded an excellent medium for the distribution of information on the latest methods of chicken-raising and poultry management. An average of 800 people visit the Station each year for the purpose of gaining first-hand knowledge of the work of that institution. In this way, Mr. Anderson has been



able to impart useful information to representatives of the commercial poultry farmers, members of branches of the Agricultural Bureau, poultry project clubs, beginners in poultry keeping, officers of the Education Department, as well as interstate and overseas visitors. He has also given addresses on poultry matters to poultry clubs, project clubs, and Branches of the Agricultural Bureau. He has attended many important Conferences in other States in the interests of the egg export trade, including the first Interstate Conference of Commercial Poultry Breeders which was held in Sydney in 1926.

Amongst other activities Mr. Anderson has contributed articles to the press for the welfare of the poultrykeeper and with the object of stimulating interest in this important section of our rural industries.

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## OUTBREAK OF PSEUDO-POULTRY PLAGUE IN VICTORIA.

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Mr. C. F. Anderson (Government Poultry Expert) recently visited Victoria to inquire into the disease which has occurred in poultry flocks in that State. He reports that Dr. H. E. Albison, of the Veterinary Science School, at Parkville, Victoria, has definitely identified the disease to be "Pseudo Poultry Plague."

It is not known how the disease first originated in Victoria, but it is assumed that the disease has been imported from overseas, either by the introduction of poultry or cage birds, because the disease has never been previously known in Australia. The severity of the disease and the seriousness of the position can be realised when it is realised that the mortality is 100 per cent. of the affected birds. There is no known cure for the disease.

It is certain that only the stringent action taken by the Victorian Department in placing the whole State in quarantine, and closing up all auction rooms, had checked the spread of a disease which threatened to entirely wipe out the poultry industry, not only in Victoria, but also in the adjoining States.

The Victorian authorities are now definitely of the opinion that the outbreak is under control.

The symptoms of the disease are:—Loss of appetite; crouching attitude; sleepiness; the eyes being half closed; watery, yellowish-white diarrhoea, with a characteristic nauseating odour. The crop is distended with a sour-smelling, greyish-brown fluid. The most marked symptom is the gasping inhalation through the half-opened beak. Most cases have a thick, mucous discharge from the nostrils and a varying amount of frothy exudate in the mouth, which occasionally hangs in threads from the end of the beak. The comb and wattles vary in color from dark-red to purple. These symptoms are followed by death in from five to seven days.

### PRECAUTIONS IN THIS STATE.

Owing to the very serious nature of the disease, stringent precautions are being taken to prevent the spread of the disease to this State; besides the heavy losses that would occur in stock, our export markets would be closed, for once the disease spread to South Australia we would be in quarantine, and no live poultry, dressed poultry, or eggs in the shell would be allowed to leave the State. This would be the ruin of our poultry industry, owing to South Australia being such a large exporter of eggs and egg pulp.

Action has been taken under the Stock Diseases Act to prevent the importation from Victoria of any poultry, ducks, geese, turkeys, &c., and also the eggs of such birds. Very close supervision is also being kept on overseas steamers against the introduction of birds from overseas, unless accompanied by proper certificates.

*In view of the seriousness of the disease, the closest co-operation of poultry breeders with the Department is urged, in the matter of reporting immediately to the Department any signs of sickness among poultry, when the trouble will be investigated.*



## BEES AND BEEKEEPING.

[Paper read by Mr. ARNOLD E. OPHEL, Middleton, at a meeting of the Mount Compass Branch of the Agricultural Bureau.]

Considering the many thousands of years during which honey-storing or hive-bees have been known, it is somewhat surprising that the average person has so little authentic knowledge of their habits. The one thing which seems generally known is that they can sting, and perhaps an exaggerated fear of this defensive action is responsible for the slight acquaintance with other more interesting points in their behavior.

My own early lack of knowledge and experience of bees was probably typical. I recall an occasion when a fellow-scholar was stung by a bee, and when we hurried to the school with a fearsome childish impression that the boy would surely die suddenly. The schoolmaster was, however, an enthusiastic amateur beekeeper, and we were given a series of lessons on bees. We were shown diagrams of the sting—the two hollow, barbed shafts which, when inserted into the skin, were so operated by a set of muscles that each point was alternately driven deeper and deeper while the poison flowed through the centre. The schoolmaster then caused a bee to sting the palm of his hand so that we could watch the operation. It was demonstrated that when a bee stings it usually tears itself away, leaving a little bunch of muscles and poison gland attached to the sting, and these muscles continue working until the poison is all pumped into the flesh. For this reason, it is advisable, if possible, to scrape off quickly the tiny white speck showing on the skin, and thus avoid receiving all of the poison. It should not be picked off, as the operation will only squeeze in the poison. If not too frightened, a bee will save its sting after injecting the poison, by whirling around and unwinding the sting, corkscrew fashion, out of the flesh—the barbs preventing it being directly withdrawn.

There are a few people whose systems react in exceptional ways to insect poisons, and bee stings may produce in them unusual swellings and rashes. The average person, however, suffers no serious effects—only a sharp burning sensation for a few minutes and perhaps a certain amount of puffiness and tenderness for a day or so. A beekeeper usually protects his face when at work because of his eyes, for admittedly this is where trouble might occur, but elsewhere stings cannot be very serious, seeing that he may receive dozens of stings in the course of a day's work (if the weather is unfavorable), and yet he can seldom locate one of them after a short while. We soon learn that the tendency of bees to sting is defence and not offence, which they seek to show, though there are some types which seem naturally more irritable than others.

This brings us to a consideration of the different races of bees and their peculiarities. Incidentally, it may be mentioned that there are many kinds of bees which are not hive-bees. Many species are like small flies and wasps (our own native bees are mostly of this type), and they do not live in large communities as do the hive-bees. They are of interest mainly to the scientist, but their connection to the bees with which we are familiar is seen in the four wings which fold down when at rest, whereas flies have only two wings—a notable example being the hover fly seen on flowers or above them with wings outstretched, and often mistaken for a bee. Native bees also play a part in the pollination of flowers, but probably of less importance than the hive-bee, because they are not such persistent gatherers, having no occasion to store up any quantity of this valuable nitrogenous food—often called bee bread.



## BREEDS INTRODUCED TO AUSTRALIA.

Australia has no hive bee of its own, though the black bee common throughout the coastal belt of the continent is usually referred to as though it belonged here. This black bee, which is a native of Europe, was first brought to New South Wales in 1822, and so favorable were the conditions that it rapidly spread through the coastal areas. It is not found in Central Australia, however, an arid belt of country having proved a barrier to its migration to those favored portions of the interior where the native bees thrive in abundance. During the '70's" and '80's" quite a number of Italian bees were brought to all the States, also a few Carniolan and Cyprian bees. These were all very distinct species, from different countries of the Old World, and doubtless, it was considered, might be useful for crossing with the black bees which had their weak points—being irritable, rather too easily discouraged in a poor season and not very resistant to disease.

The Cyprian bees were good workers but in temper were as fiery as their color and little breeding was done with them. The Italian proved quiet, thrifty, and hardy, and this yellow-banded race quickly established itself a favorite. The Carniolan dropped into the background without a thorough trial, apparently, perhaps, because in color they somewhat resembled the black bees already here. In recent years interest was revived in the Carniolan and they have been found to possess some very desirable qualities, especially for a changeable climate like ours.

Possibly the time will come when we shall have evolved a type of bee most suited to our climatic conditions, but it will take a time to fix a type where so much mixed stock is already to hand. It is considered that the bee of Northern Italy—known as the Ligurian—was gradually evolved from crossing the German black bee with the bright yellow bees of the Mediterranean area. By a process of selection, the present type eventuated, and having been bred in that country for hundreds of years, the characteristics are now so fixed as to be practically a separate race.

The German bee may have in the remote past been taken also to the little country of Carniola, surrounded by the Julian Alps, and, if so, the process of selection has been carried on in that isolated country so long that a distinct race appears to have resulted, superior to the original black bee in every way. The Alpine climate has hardened the constitution and developed thriftiness to a notable extent, while the gradual discarding of the more irritable stocks has, in the course of time, strengthened the peaceable tendencies, until to-day the general run of the stock is such that veils are unknown in Carniola and smoke is not used, unless it be a puff from a cigarette to induce the bees to move out of the way of the fingers while working.

## COMMERCIAL BEE-KEEPING.

Although honey-storing bees have been known and honey appreciated by human beings as food since the dawn of history (and probably before, for references may be found in the oldest writings), bee-keeping as we understand the term is of comparatively recent development. It is rather interesting, however, to note that many crude forms of domestication—if one may apply that term to a free flying insect like the bee—have been known for centuries and are still used in some parts of the world. Ideas were borrowed from the habits of bees themselves and short lengths of hollow trees were set up for the bees to carry on their work; this in turn suggested clay cylinders and other more or less portable vessels as places in which the honey might be stored and be better available than in the trees and hollowed rocks. In Cyprus cavities are often left in the walls of gardens, and swarms placed in them, so that the householder may help himself to their stores when he feels inclined.

But true domestication in the sense we apply the term to animals and birds is unknown. A colony of any of the races of hive-bees taken from tree or rock will make itself at home; and with equal unconcern a colony whose forbears have lived for 50 years in man-made hives will "go-bush" and be at no loss to themselves.



In Australia the ever useful kerosene case is the most common form of primitive hive, into which the bees cluster and build as the spirit moves them, and it has the disadvantage of all primitive methods wherein the bees build the combs to suit themselves. Knowledge of the condition of these colonies is largely guesswork, and disease may easily secure a footing before the owner is aware of it.

Movable combs made commercial bee-keeping possible, and while the fundamental principle is simplicity itself, many intricate patterns of hives were evolved before the Rev. Langstroth gave to the world the idea upon which practically all modern hives are made. Bees are comparatively exact in their habits, and it was noted that to ignore these habits in designing a hive made it unworkable. All parts to be moved must have a bee space (approximately 5/16in.) left round them, for where bees cannot crawl they plaster up with wax or a gumming substance called propolis, which they collect from various plants and trees. Similarly, if they are given more room between movable parts than they require for passing, they will in time fill up the unnecessary spaces, possibly with a lining of cells adapted to suit the cavity. For bees, marvellously exact as they seem to be, are really more wonderful in their manner of adapting the general principles of comb building to the circumstances in which they find themselves. The familiar design of six-sided cells, fitting so exactly to each other without loss of space, has for ages been looked upon as the ideal of strength, beauty, and economy, but they build two sizes of cells, one giving 28 to the square inch and the other 18. The smaller is for rearing worker bees, the larger for drones and for storing honey—though the smaller cells may also be storage cells for honey and pollen when not required for brood. Now it is the merging of one size into the other and the fitting of either or some intermediate size into odd spaces which best shows the wonder of their workmanship.

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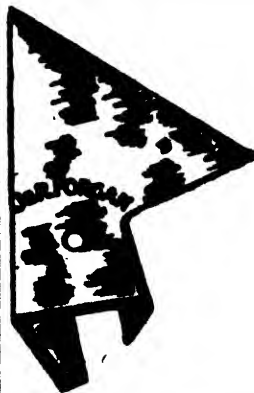
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## THE INHABITANTS OF THE HIVE.

## THE QUEEN.

This difference in cells leads us to note some details regarding the bees themselves. In a hive or colony will be found, under normal conditions, three kinds of bees—one queen, many drones, and many more worker bees. Given sufficient room and prosperous conditions, they may reach a total of 100,000. The queen is the mother of the colony and, while she is all right, no further queens are permitted until they are preparing to send out a swarm, in which case there will be a number of peanut-shaped cells showing in various places in the combs. These cells first show as little cups—like acorn cups, in each of which the queen lays an egg, and they are then lengthened as the grub which emerges from the egg grows. These grubs are fed on a very rich pre-digested food prepared in a portion of the digestive system of the worker bees, known as the chyle stomach. This organ is most active in the younger bees up to about five or six days old, and they are therefore known as nurse bees, for they feed this food to *all* young grubs for the first day or two of growth, weaning all but the queens on to some mixture of honey and pollen, the drones receiving a coarser preparation than the workers.

Only the queens receive the chyle food, usually referred to as "royal jelly," during the whole period of larval development and they become perfect females. All worker bees are females, but their maternal organs are undeveloped, though under stress of need, as when the colony has been queenless for a few weeks, any worker is liable to produce a few eggs. The queen is fully developed in this respect; therefore, her body is much larger and longer than that of a worker. The workers are sometimes wrongly called "neuters," because they do not mate. The queen alone has the impulse to mate, and the act occurs while on the wing, normally some time between the seventh and tenth day after emerging from the cells. When mated, she then becomes just an egg machine; a remarkable one, too, for when conditions are right she is capable of laying several times her own weight in eggs in 24 hours—rather a staggering performance. Obviously, feeding plays an all-important part in this matter. Some richly-nitrogenous, easily-digested food that passes immediately into her system must be fed to her almost continuously during the active laying period, which may continue for weeks. Possibly she is supplied with a substance similar to royal jelly, upon which she was reared.

The queen differs in other respects from the workers, having neither the brush-tongue for collecting nectar from flowers or the honey-sac for storing it, or the curious receptacles on the rear legs for carrying pollen. The comparatively enormous loads which are carried make intelligible the phrase "as big as a bee's knee."

Once egg-laying commences the queen does not mate again, nor does she leave the hive, unless the colony becomes prosperous enough to cast off a swarm, when she goes out with a portion of the bees to form a hive elsewhere, leaving a young queen to carry on.

The thousands of drones which they are prompted to raise in the spring is Nature's prodigal way of providing for the survival of the race (and the fittest), for only one drone is required for the young queen; but when thousands are flying from each colony the chances of inbreeding are reduced to a minimum. Moreover, the young queen flies strongly and far, and only the strongest of the drones will overtake her.

## THE DRONE.

In following the history of the drone we stumble into what is surely one of Nature's most astounding miracles. The drone is the son of his mother only; in other words, a queen can lay drone eggs even if she is not mated—a phenomenon known as parthenogenesis. When mated, she lays worker or drone eggs at will, according to the size of the cells in which she deposits them. There is no outward difference in the eggs, but those impregnated by the male element produce females, those not impregnated produce



males. While every worker egg contains a potential queen—that is to say, it could be developed into a queen if fed with royal jelly and its cell suitably enlarged—nothing will modify the development of the drone. He is destined to live his useless, defenceless life, dependent upon the charity of the working community for his very existence, on the off chance that he, among the many thousands taking their daily midday flight, may meet a mating queen and pass on his mother's characteristics to posterity through her.

Nature is ruthless even in this matter, for the drone dies in the act of mating; and, should prosperous times pass quickly and the danger of shortage of stores occur, the workers unhesitatingly drive all the drones out of the hive, where they must perish, for they cannot gather food outside even if it were there. Should a queenless hive be near, many will find sanctuary, because the workers there are always hopeful of raising a queen and recognise the possible need of drones, so therefore tolerate them at all seasons.

Since drones live on the honey and pollen gathered by the workers, they are expensive to rear and maintain, and the beekeeper does what he can to prevent large numbers being raised by providing the bees with comb foundation containing only worker cells. Flat sheets of this foundation fastened into wooden frames induce the bees to build combs that are convenient to handle and economical to use.

#### BUILDING THE COMB.

Beeswax is a product of the bees' bodies, formed in tiny scales between the segments of the abdomen when the bees are gorged with honey and hot as a result of clustering closely together. To watch bees comb-building is a puzzling affair. A bee takes a tiny scale in its jaws and threads it this way and that, clamps it over the edge of a partly-formed cell wall, gives it a bite or two, and then apparently gets tired of the job and goes off. Another takes her place and "fiddles" round a while, and leaves it, and so they are continually coming and going in a seemingly haphazard fashion, yet all the time the work proceeds by imperceptible stages over the face of the comb—the wall edges always showing a rounded finish. The amount of weight which this tissue-like substance will carry is surprising. Melt a piece of natural comb containing a pound of honey and the wax will only amount to about half an ounce.

The queen and drones take no part in comb-building, and it is likely that the process of secretion is a heavy drain on the system of the worker. But building in any quantity only occurs (in their natural state) during periods of prosperity conducive to heavy brood rearing, which more than makes up for wastage of the stock. There is something wonderfully consistent in the operations of a colony, dovetailing one into the other so well. Plenty of food, more bees; more bees, more work; more work, more wastage—but more bees to take their place.

#### THE WORKER.

The life of a worker bee is short in most cases, a matter of a few weeks at most when there is work to be done. The greater the activity, the shorter the life; wear and tear of wings and of the internal organs soon renders them unfit to carry on, and realising this they usually crawl away from the hive if possible when they feel the limit mark has been reached. Autumn-raised stock will live through the winter if there is little activity of the colony, though in this country a certain amount of brood rearing is often carried on through a mild winter if the bees are kept snug and warm. In countries where snow occurs it is usual to winter all the bees in cellars, where they go into a state of complete inactivity.

Drones are longer lived than workers when conditions are favorable enough to allow of their continuance, and commercial queen breeders make provision for saving desirable kinds over the winter in order to secure earlier matings than would be possible if it was necessary to wait for spring drones. Taking 24 days to hatch, it is approximately 40 days from the laying of the egg until the drone takes life seriously, and the colony must first attain a prosperous condition before it prepares for drones.



Worker bees are flying to the fields in 28 or 30 days after the eggs are laid, and they meanwhile have done duty for several days in the hive as nurse bees, having hatched on the 21st day.

#### BREEDING AND HEREDITY.

A queen may take her mating flight 20 days from the egg, hatching as she does on the fifteenth or sixteenth day. Her life may be four or five years, though from a commercial point of view she is seldom worth retaining as the head of a producing colony after the second year. She started life with a certain number of eggs in her ovaries, and after a couple of active laying seasons may not be able to maintain the colony at productive working strength. If a colony shows up exceptionally well in the amount of honey produced and there are no undesirable qualities about the stock, it may prove worth while retaining the queen for breeding purposes for a year or two longer (in a small hive where she will not be tempted to outlay herself). Though, as a matter of fact, unless she is purely bred herself it is doubtful whether she would throw true to type.

The laws of heredity have to be reckoned with in breeding bees as in other creatures, and these are added difficulties, because the mating cannot be controlled. A breeding queen is selected on the characteristics of the colony she has raised—productiveness, combined with a reasonable docility in handling, and evidence of a hardy constitution being sought, with regularity of the size of the body and markings of the workers as an indication that she may be expected to produce her like in other queens. Of course, just what the progeny of the other queens will prove to be depends upon how they mate. But in any case, they will produce drones of the same strain because, as already pointed out, the drone is unaffected by the mating of his mother.

Commercial breeders seek an area where the queens can have, say, a two mile flight before reaching drone stock other than that retained by the breeder for the purpose, and he may expect to get a fairly high percentage of the mating he wants. In practice, it usually pans out that in a few years all stock flying within reach of the breeder is so permeated by his strain that very few mis-matings occur. Should he endeavor to build up a strain by selection and crossing, he must seek complete isolation for the mating stock—a somewhat difficult proposition, for bees sometimes inhabit unexpected places. They have been found in rabbit burrows, hollow fence posts, and other queer places where trees were not available.

#### LEGISLATION.

In the early days of Italian importations, sufficient interest in this matter was taken by the Government to have Kangaroo Island declared a sanctuary for Italian bees.

Our State has been backward in the matter of protective legislation and inspection. At the present time, of course, the financial stringency is sufficient to hold it up, but we, who are dependent upon bees for our living, have waited for some definite attempt to be made to cope with the trouble; we are always fighting individually. Surely it is no more right that, through the carelessness of some people, the special diseases of bees should be allowed to ravage the country any more than swine fever or fruit diseases should go unchecked. Nobody desires to hinder his neighbor from keeping a few colonies as a sideline, but if they are allowed to die out or are neglected they become a menace to others, and if they are kept in ordinary boxes, where inspection of the combs is impossible, they are likely to be a menace at any time.

As with other primary industries, seasonal conditions provide sufficient difficulties and uncertainties without adding those which are the outcome of carelessness, though I am rather inclined to think it may be lack of knowledge as much as anything.

We have progressed quite a long way from the days when it was thought necessary to brimstone the bees to rob their stores. We are ahead of those times when boxes were turned upside down and the bees drummed up into another while the combs were



cut out and squeezed into a muslin bag to dip out their contents, which sometimes included the juices of mashed up bee grubs, clean enough in themselves, but hardly likely to improve the flavor of honey.

#### EXTRACTION OF THE HONEY.

Our frames of comb are now placed in wire baskets and whirled round at sufficient speed to throw out the honey, and are then returned to the hives to be used again. Honey flows are not always of long duration, and the great thing is to keep the bees storing all the time it is available. Their natural tendency is to fill up the storage space and then sit back. On the other hand, if they had to be continually rebuilding comb, as in the old way of working, considerable honey would be consumed and time wasted in the process.

## If you can't grow vegetables

*and you can't buy them, you will  
certainly need a stock of Swallow  
and Ariell's Compressed Vegetables.*



**T**HEY'RE equal in every way to fresh, as only water is removed—true flavour is retained. One pound goes as far as ten of the fresh, so that they're easily carried. Store them as long as you like—with a few packets at hand you need never be short of health-giving vegetables.

### Here's the Range of Compressed Vegetables.

Carrots, Parsnips, Turnips, Onions, and mixed—Compressed and supplied in  $\frac{1}{2}$ lb. cartons and 1lb. tins.

Tomatoes and Rhubarb—Compressed and supplied in  $\frac{1}{2}$ lb. cartons.

Beetroot—Loose, in 1lb. tins.

Mixed Vegetables—Loose, in  $1\frac{1}{2}$ oz. packets.

# SWALLOW & ARIELL'S COMPRESSED VEGETABLES



From the extractor, honey should be placed in clearing tanks for a few days to allow particles of wax and pollen to rise to the surface, to be skimmed off. A gentle heating of the honey to about 120 degrees hastens the production of a clear, bright article for the market.

Should the honey show at any time any signs of fermentation it indicates that the bees had not completed their part of the business when it was taken. Nectar as it comes from the flowers is quite different chemically from honey—it is just like a sweetened water and will ferment readily. The bees not only evaporate a large proportion of the moisture, but certain secretions of the honey sac, into which the nectar is taken up many times after it reaches the hive, gradually resulting in changing its chemical condition—a process known as sugar inversion. When the bees have finished with it they seal it over in the comb, and when extracted at that stage it may be said to keep indefinitely, though it is wise to exclude air from it if stored for any length of time, for it has the property of absorbing considerable moisture. Most honeys show more or less granulation after a time, and is then known as candied honey; this is no real detriment, and it may safely be liquified by standing the vessel in hot water and rendering slowly.

#### HONEY AS A FOOD.

Honey occupies a unique position in Nature, and I think the ancient peoples realised its value more than we do to-day. No other food passes so rapidly into the blood stream, for it can be assimilated unchanged, only requiring dilution to allow absorption to take place. Although it has no tissue-building value, it is a rapid energy-producer, as most beekeepers have had opportunity of proving. The mineral content of honey also makes it a most valuable item in the food of growing children, and a prominent doctor of Victoria has stated that the greater part of teeth decay would disappear in the next generation if every one used even one teaspoonful of honey every day in their food. It sounds a small thing to lead to so great a result, but the daily portion would build up a deficiency of our systems which our civilised habits in food have to account for. Probably other troubles would disappear or be lessened, too, if everyone had a daily spoonful of this natural tonic.

#### MARKETING PROBLEMS.

Apart from health considerations, I know one thing it would cure, and that is the marketing problem—for, as in every other primary industry, there are difficulties in securing a reasonable return to the producer when the market is glutted in a good season. On the whole, we have the largest exportable surplus of any of the Australian States, and interstate trading makes it necessary to consider the Commonwealth as one market when discussing this question. If every family in Australia used 2ozs. of honey every day, they would absorb over 25,000 tons per year—which is more than we produce.

It would be rather curious to become importers, but while I doubt that the need will ever arise, it is not because I think we could always produce that quantity. It is not unlikely that the future will bring to many beekeepers the problem of where to get sufficient honey to make their calling worth while. In this State most of our table honey comes from red, blue, and pink gum, and the wholesale cutting out of these timbers has already seriously depleted the areas available for bees. Most land owners seem to think that once the axe starts, everything should go—which seems a pity, because there is reason to believe that a certain amount of timber left would be an advantage rather than otherwise.

In a country like New Zealand, where so many varieties of clover thrive, beekeeping has expanded with the larger areas laid down as pasture. The advantage has not been one-sided either, for the bees assist the sheep and dairy men in securing good stands of clover by ensuring satisfactory pollination. Unfortunately, few portions of this country are suitable for the heavy honey-producing clovers, such as White Dutch, Strawberry, and Alsike.



## RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.  
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending December 31st, 1930. |                         |                         |         |
|--------------------------|---------------------|---------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                       | (2) *                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 110                                     | (5) 129                 | (6) *                   | 239     |
| Williams, W. R. ....     | Frewville .....     | (7) 150                                     | (8) 176                 | (9) 217                 | 543     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 182                                    | (11) 150                | (12) *                  | 332     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 178                                    | (14) 199                | (15) *                  | 377     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 127                                    | (17) *                  | (18) *                  | 127     |
| Pearman, E. D. ....      | Rosewater .....     | (19) 167                                    | (20) 163                | (21) 155                | 485     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                      | (23) *                  | (24) 158                | 158     |
| Burton, C. J. C. ....    | Mallala .....       | (25) 184                                    | (26) 169                | (27) 184                | 537     |
| Heath, H. E. ....        | Mile End .....      | (28) 186                                    | (29) *                  | (30) 160                | 346     |
| Heath, H. E. ....        | Mile End .....      | (31) 150                                    | (32) 136                | (33) 114                | 400     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 134                                    | (35) 162                | (36) 179                | 475     |
| Howard, T. W. ....       | Woodville .....     | (37) 159                                    | (38) 133                | (39) 165                | 457     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                      | (41) 181                | (42) 166                | 347     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 127                                    | (44) 191                | (45) 169                | 487     |
| Gameau, V. F. ....       | Woodville .....     | (46) 168                                    | (47) 170                | (48) 132                | 470     |
| Gameau, V. F. ....       | Woodville .....     | (49) 118                                    | (50) 125                | (51) 157                | 450     |
| Aird, J. R. & Son ....   | Kilkenny .....      | (52) 137                                    | (53) 171                | (54) 178                | 486     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                      | (56) 123                | (57) *                  | 123     |
| Barrett, L. ....         | Angaston .....      | (58) 136                                    | (59) 148                | (60) 168                | 452     |
| Barrett, L. ....         | Angaston .....      | (61) *                                      | (62) 114                | (63) 180                | 294     |
| Barrett, L. ....         | Angaston .....      | (64) 151                                    | (65) 123                | (66) 137                | 411     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 124                                    | (68) 83                 | (69) 180                | 387     |
| Wiese, W. ....           | Cabra .....         | (70) 205                                    | (71) 183                | (72) 169                | 557     |
| Wiese, W. ....           | Cabra .....         | (73) 181                                    | (74) 176                | (75) 162                | 519     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 168                                    | (77) 139                | (78) 164                | 471     |
| Urlwin, A. P. ....       | Balaklava .....     | (79) *                                      | (80) †                  | (81) 161                | 161     |
| Riggs, N. ....           | Camden Park .....   | (82) 199                                    | (83) 162                | (84) *                  | 361     |
| Riggs, N. ....           | Camden Park .....   | (85) 179                                    | (86) 127                | (87) 162                | 468     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 163                                    | (89) 180                | (90) 192                | 535     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 129                                    | (92) 176                | (93) 190                | 495     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                      | (95) 153                | (96) *                  | 153     |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 196                                    | (98) 169                | (99) †                  | 365     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 189                                   | (101) 82                | (102) *                 | 271     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 151                                   | (104) *                 | (105) *                 | 151     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 135                                   | (107) 150               | (108) 176               | 461     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 159                                   | (110) 206               | (111) *                 | 365     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 187                                   | (113) 163               | (114) *                 | 350     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 166                                   | (116) 152               | (117) 144               | 462     |
| Hill, W. ....            | Knoxville .....     | (118) 168                                   | (119) 176               | (120) 164               | 508     |
| Hill, W. ....            | Knoxville .....     | (121) 172                                   | (122) 172               | (123) 166               | 510     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 140                                   | (125) *                 | (126) 115               | 255     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                     | (128) 177               | (129) 167               | 344     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 42                                    | (131) 167               | (132) 164               | 373     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 164                                   | (134) 174               | (135) 196               | 534     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 191                                   | (137) 180               | (138) 170               | 541     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 184                                   | (140) 162               | (141) 124               | 470     |



*Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.*

| Competitors.            | Address.           | Score for Month ended December 31st, 1930. |                         |                         |         |
|-------------------------|--------------------|--------------------------------------------|-------------------------|-------------------------|---------|
|                         |                    | Bird No. and Eggs Laid.                    | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Compton, R. C. ....     | Woodeforde ....    | (142) 130                                  | (143) 172               | (144) 166               | 468     |
| Connor, D. C. ....      | Gawler ....        | (145) 105                                  | (146) 132               | (147) 126               | 363     |
| Robinson, A. E. ....    | Hectorville ....   | (148) 207                                  | (149) 178               | (150) 183               | 568     |
| Vann, R. S. ....        | New Hindmarsh ...  | (151) 149                                  | (152) 138               | (153) 112               | 399     |
| McLean, J. G. ....      | Black Forest ....  | (154) 114                                  | (155) 118               | (156) 136               | 368     |
| Fidge, H. ....          | Clarence Park .... | (157) 143                                  | (158) 136               | (159) *                 | 279     |
| Fidge, H. ....          | Clarence Park .... | (160) 120                                  | (161) 141               | (162) 182               | 443     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (163) 155                                  | (164) 113               | (165) *                 | 268     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (166) 141                                  | (167) 130               | (168) 136               | 407     |
| Monkhouse, A. J. ....   | Woodside ....      | (169) 145                                  | (170) 175               | (171) *                 | 320     |
| Monkhouse, A. J. ....   | Woodside ....      | (172) *                                    | (173) *                 | (174) 164               | 164     |
| Monkhouse, A. J. ....   | Woodside ....      | (175) 167                                  | (176) *                 | (177) *                 | 167     |
| Monkhouse, A. J. ....   | Woodside ....      | (178) *                                    | (179) *                 | (180) 134               | 134     |
| Sage, H. R. ....        | Nuriootpa ....     | (181) 129                                  | (182) *                 | (183) 168               | 297     |
| Mitchell, W. J. ....    | Woodside ....      | (184) 176                                  | (185) *                 | (186) 196               | 372     |
| George, L. E. ....      | Redfern ....       | (187) 174                                  | (188) 195               | (189) 151               | 520     |
| George, L. E. ....      | Redfern ....       | (190) 184                                  | (191) 170               | (192) *                 | 354     |
| George, L. E. ....      | Redfern ....       | (193) 136                                  | (194) 169               | (195) 171               | 476     |
| George, L. E. ....      | Redfern ....       | (196) 155                                  | (197) 181               | (198) 184               | 520     |
| Aird, J. R., & Son .... | Kilkenny ....      | (199) 175                                  | (200) 177               | (201) *                 | 352     |
| Aird, J. R., & Son .... | Kilkenny ....      | (202) 143                                  | (203) 140               | (204) 139               | 422     |
| Gameau, V. F. ....      | Woodville ....     | (205) 158                                  | (206) 134               | (207) 145               | 437     |
| Totals.....             | .....              | 9,212                                      | 8,871                   | 8,078                   | 26,161  |

*Section 3.—Black Orpingtons.*

| Competitors.            | Address.           | Score for Month ending December 31st, 1930. |                         |                         |         |
|-------------------------|--------------------|---------------------------------------------|-------------------------|-------------------------|---------|
|                         |                    | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Aird, J. R., & Son .... | Kilkenny ....      | (208) 131                                   | (209) 99                | (210) 161               | 391     |
| Aird, J. R., & Son .... | Kilkenny ....      | (211) 126                                   | (212) 146               | (213) *                 | 272     |
| Williams, W. R. ....    | Frewville ....     | (214) 144                                   | (215) 176               | (216) 164               | 484     |
| Williams, W. R. ....    | Frewville ....     | (217) †                                     | (218) *                 | (219) 138               | 138     |
| Gurr, A. and H. ....    | Scott's Creek .... | (220) *                                     | (221) *                 | (222) *                 | —       |
| Andrewartha, A. ....    | Underdale ....     | (223) *                                     | (224) 171               | (225) 166               | 337     |
| McFarlane, A. S. ....   | Kilkenny ....      | (226) 181                                   | (227) 154               | (228) 150               | 485     |
| Connor, D. C. ....      | Gawler ....        | (229) *                                     | (230) 158               | (231) *                 | 158     |
| Gillick, W. J. ....     | New Hindmarsh ...  | (232) 97                                    | (233) *                 | (234) *                 | 97      |
| Osborn, E. L. ....      | Camden.....        | (235) 127                                   | (236) 177               | (237) 162               | 466     |
| Totals.....             | .....              | 806                                         | 1,081                   | 941                     | 2,828   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.           | Score for Month ending December 31st, 1930. |                         |                         |         |
|--------------------|--------------------|---------------------------------------------|-------------------------|-------------------------|---------|
|                    |                    | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Gameau, V. F. .... | Woodville ....     | (238) 140                                   | (239) 148               | (240) 102               | 390     |
| Fidge, H. ....     | Clarence Park .... | (241) 164                                   | (242) 168               | (243) 82                | 414     |
| Totals.....        | .....              | 304                                         | 316                     | 184                     | 804     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



## NARRUNG HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                         | Butterfat.           |                     |                         | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|-------------------------|----------------------|---------------------|-------------------------|---------------|
|          |                              |                              | Per Herd during Nov. | Per Cow during Nov. | Per Cow October to Nov. | Per Herd during Nov. | Per Cow during Nov. | Per Cow October to Nov. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                    | Lbs.                 | Lbs.                | Lbs.                    | %             |
| 5/C....  | 30                           | 24-50                        | 15,292½              | 509-75              | 1,156-87                | 755-63               | 25-19               | 56-23                   | 4-94          |
| 5/E....  | 32-63                        | 31-27                        | 17,718               | 541-56              | 1,176-66                | 955-74               | 29-21               | 60-75                   | 5-40          |
| 5/D....  | 32                           | 24-40                        | 18,147               | 567-09              | 1,214-65                | 908-50               | 28-39               | 61-32                   | 5-01          |
| 5/J....  | 25                           | 25                           | 12,345               | 493-80              | 1,079-30                | 654-55               | 26-18               | 57-86                   | 5-30          |
| 5/O....  | 25                           | 24-57                        | 17,040½              | 681-62              | 1,513-87                | 886-88               | 35-48               | 79-42                   | 5-20          |
| 5/R....  | 46-97                        | 45-80                        | 20,215½              | 430-39              | 964-51                  | 867-46               | 18-47               | 42-35                   | 4-29          |
| 5/S....  | 30                           | 29-73                        | 14,874               | 495-80              | 1,196-92                | 749-64               | 24-99               | 59-68                   | 5-04          |
| 5/T....  | 23-83                        | 20-73                        | 14,740½              | 618-57              | 1,308-76                | 641-93               | 26-94               | 60-48                   | 4-35          |
| 5/U....  | 20                           | 15                           | 13,425               | 671-25              | 1,583-85                | 572-26               | 28-61               | 71-07                   | 4-26          |
| 5/Y....  | 27                           | 23-03                        | 16,698½              | 618-46              | 1,327-14                | 873-26               | 32-34               | 68-44                   | 5-23          |
| 5/Z....  | 29                           | 29                           | 24,975               | 861-21              | 1,854-97                | 1,180-18             | 40-70               | 86-93                   | 4-78          |
| 5/AA.... | 17-93                        | 12-30                        | 6,231                | 347-52              | 722-89                  | 333-22               | 18-58               | 39-00                   | 5-35          |
| 5/CC.... | 34                           | 32                           | 14,055               | 413-38              | 1,109-47                | 653-44               | 19-22               | 49-76                   | 4-65          |
| 5/DD.... | 21                           | 18-60                        | 12,209               | 581-38              | 1,225-40                | 644-12               | 30-67               | 63-46                   | 5-28          |
| 5/EE.... | 16-40                        | 15-30                        | 9,552                | 582-44              | 1,381-35                | 464-46               | 28-32               | 67-69                   | 4-86          |
| 5/II.... | 27-83                        | 27-53                        | 21,878               | 786-13              | 1,653-65                | 963-58               | 34-62               | 74-75                   | 4-40          |
| 5/JJ.... | 27                           | 27                           | 19,650               | 727-78              | 1,669-94                | 879-77               | 32-58               | 76-79                   | 4-48          |
| 5/KK.... | 24                           | 18-40                        | 10,764               | 448-50              | 988-55                  | 479-38               | 19-97               | 44-66                   | 4-45          |
| 5/MM.... | 13-03                        | 10-17                        | 7,350                | 564-08              | 1,224-62                | 411-94               | 31-61               | 64-73                   | 5-60          |
| 5/NN.... | 27                           | 24-37                        | 17,249½              | 638-87              | 1,270-67                | 728-26               | 26-97               | 55-92                   | 4-22          |
| 5/OO.... | 21-83                        | 20-50                        | 13,669               | 626-15              | 1,285-51                | 658-79               | 30-18               | 62-61                   | 4-82          |
| Means.   | 26-26                        | 23-77                        | 15,146-62            | 576-80              | 1,275-52                | 726-81               | 27-68               | 61-47                   | 4-80          |

## THE HILLS HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                      | Butterfat.           |                     |                      | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|---------------|
|          |                              |                              | Per Herd during Nov. | Per Cow during Nov. | Per Cow July to Nov. | Per Herd during Nov. | Per Cow during Nov. | Per Cow July to Nov. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                 | Lbs.                 | Lbs.                | Lbs.                 | %             |
| 7/D....  | 26-23                        | 23-70                        | 21,117½              | 805-09              | 3,507-21             | 887-94               | 33-85               | 146-59               | 4-20          |
| 7/E....  | 25-33                        | 23-13                        | 23,423½              | 924-73              | 3,616-22             | 975-68               | 38-52               | 148-64               | 4-17          |
| 7/H....  | 7                            | 6-37                         | 7,222                | 1,032-14            | 3,888-33             | 340-99               | 48-71               | 179-70               | 4-72          |
| 7/J....  | 20-03                        | 17-60                        | 15,549               | 776-28              | 2,952-54             | 734-86               | 36-69               | 158-92               | 4-73          |
| 7/K....  | 17-37                        | 16-43                        | 10,460               | 947-61              | 3,988-08             | 602-57               | 39-67               | 171-25               | 4-21          |
| 7/L....  | 31-27                        | 28-23                        | 25,318½              | 809-67              | 2,508-84             | 1,176-24             | 37-62               | 118-33               | 4-65          |
| 7/O....  | 21                           | 16-93                        | 12,747               | 609-72              | 2,421-37             | 622-48               | 29-77               | 116-65               | 4-91          |
| 7/S....  | 14                           | 14                           | 9,705                | 693-21              | 3,070-83             | 530-36               | 37-88               | 195-86               | 5-46          |
| 7/TA.... | 10-80                        | 10-80                        | 7,693½               | 712-36              | 3,184-01             | 339-45               | 30-60               | 133-12               | 4-28          |
| 7/V....  | 6                            | 6-87                         | 8,560                | 951-11              | 1,161-22             | 401-57               | 44-62               | 54-26                | 4-69          |
| 7/W....  | 20-40                        | 20-30                        | 20,368½              | 998-45              | 3,343-49             | 923-65               | 45-27               | 149-80               | 4-53          |
| 7/X....  | 16                           | 16                           | 15,555               | 972-19              | 3,912-69             | 667-51               | 41-72               | 163-05               | 4-29          |
| 7/Y....  | 20-40                        | 19-77                        | 16,060½              | 788-26              | 2,899-20             | 760-37               | 37-27               | 115-13               | 4-73          |
| 7/Z....  | 10                           | 5                            | 2,865                | 286-50              | 2,120-55             | 135-77               | 13-58               | 96-08                | 1-74          |
| 7/AA.... | 8                            | 6-53                         | 2,239                | 654-87              | 2,232-51             | 259-74               | 32-47               | 118-11               | 4-96          |
| 7/BB.... | 15                           | 10-40                        | 10,689               | 713-60              | 2,876-73             | 434-51               | 28-97               | 115-72               | 4-07          |
| 7/DD.... | 12                           | 11                           | 9,090                | 757-50              | 3,589-91             | 458-06               | 38-17               | 175-10               | 5-04          |
| 7/EE.... | 28-33                        | 23-33                        | 15,621               | 593-27              | 2,384-33             | 674-98               | 25-64               | 101-43               | 4-32          |
| 7/FF.... | 11                           | 11                           | 11,220               | 1,020-00            | 4,694-21             | 482-01               | 43-82               | 201-16               | 4-30          |
| 7/GG.... | 14-63                        | 14-63                        | 11,997               | 769-52              | 2,359-71             | 620-68               | 42-42               | 120-89               | 5-31          |
| 7/HH.... | 16-67                        | 14-17                        | 10,960               | 657-47              | 2,879-46             | 474-62               | 28-47               | 124-90               | 4-33          |
| 7/II.... | 13                           | 12-33                        | 7,710                | 593-07              | 2,620-22             | 359-42               | 27-65               | 124-36               | 4-66          |
| Means.   | 16-61                        | 15-02                        | 12,949-59            | 779-54              | 3,050-45             | 588-33               | 35-42               | 137-05               | 4-54          |



## LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                          | Butterfat.           |                     |                          | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|--------------------------|----------------------|---------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during Nov. | Per Cow during Nov. | Per Cow December to Nov. | Per Herd during Nov. | Per Cow during Nov. | Per Cow December to Nov. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                     | Lbs.                 | Lbs.                | Lbs.                     | %             |
| 6/B ...  | 20-43                        | 20-33                        | 13,690               | 670-09              | 5,380-10                 | 582-10               | 28-49               | 225-50                   | 4-25          |
| 6/C ...  | 27-70                        | 27-70                        | 18,780½              | 677-70              | 6,947-14                 | 772-55               | 27-88               | 293-70                   | 4-13          |
| 6/E ...  | 20                           | 18                           | 12,075               | 603-75              | 4,897-22                 | 468-32               | 23-42               | 196-27                   | 3-88          |
| 6/F ...  | 25-83                        | 25-83                        | 20,350½              | 778-92              | 7,708-25                 | 943-15               | 36-55               | 359-08                   | 4-66          |
| 6/I ...  | 18                           | 17                           | 9,525                | 529-17              | 4,859-14                 | 443-89               | 24-66               | 207-15                   | 4-66          |
| 6/Q ...  | 22                           | 19-73                        | 9,298                | 422-63              | 5,374-31                 | 444-47               | 20-20               | 259-02                   | 4-78          |
| 6/R ...  | 22                           | 19                           | 8,670                | 394-09              | 4,030-32                 | 467-37               | 21-24               | 217-48                   | 5-39          |
| 6/U ...  | 28-10                        | 18-13                        | 9,220½               | 328-13              | 3,249-47                 | 400-30               | 14-25               | 139-63                   | 4-34          |
| 6/W ...  | 26-87                        | 22-80                        | 13,747½              | 511-63              | 5,855-45                 | 661-78               | 24-68               | 280-91                   | 4-81          |
| 6/X ...  | 28-97                        | 23-97                        | 25,031½              | 864-05              | 9,038-12                 | 956-38               | 33-01               | 360-86                   | 3-82          |
| 6/Y ...  | 19-10                        | 15-27                        | 9,520½               | 496-90              | 5,243-10                 | 375-62               | 19-60               | 225-75                   | 3-92          |
| 6/BB ... | 18                           | 15                           | 9,105                | 505-83              | 3,546-69                 | 457-08               | 25-39               | 160-27                   | 5-02          |
| 6/DD ... | 31                           | 18-27                        | 10,030½              | 322-89              | 4,981-26                 | 429-90               | 13-84               | 221-20                   | 4-32          |
| 6/EE ... | 47-30                        | 37-17                        | 24,080               | 509-05              | 6,109-54                 | 927-97               | 19-62               | 268-54                   | 3-87          |
| 6/FF ... | 24-67                        | 22-17                        | 18,672½              | 756-89              | 5,393-95                 | 872-86               | 35-38               | 240-64                   | 4-67          |
| 6/II ... | 33-90                        | 31-37                        | 23,778½              | 701-15              | 9,968-06                 | 1,014-05             | 29-90               | 312-31                   | 4-26          |
| 6/JJ ... | 21                           | 13-30                        | 8,838                | 420-86              | 6,510-88                 | 407-65               | 19-41               | 303-41                   | 4-61          |
| 6/KK ... | 25-83                        | 16-63                        | 12,869½              | 498-24              | 6,493-19                 | 536-48               | 20-77               | 280-47                   | 4-17          |
| 6/LL ... | 21-93                        | 20-07                        | 14,217½              | 648-31              | 6,508-70                 | 613-23               | 27-06               | 268-97                   | 4-31          |
| 6/MM ... | 15                           | 12                           | 7,830                | 522-00              | 5,569-56                 | 381-47               | 25-43               | 267-43                   | 4-87          |
| 6/NN ... | 19                           | 10-87                        | 4,148½               | 218-35              | 4,075-93                 | 209-29               | 11-01               | 186-92                   | 4-97          |
| 6/OO ... | 19-83                        | 10-17                        | 7,801                | 393-39              | 6,217-29                 | 359-05               | 18-11               | 278-72                   | 4-62          |
| Means .  | 24-39                        | 19-76                        | 13,240-00            | 542-97              | 5,765-46                 | 578-41               | 23-72               | 255-58                   | [ 4-37        |

ORCHARD NOTES FOR SOUTHERN DISTRICTS,  
JANUARY, 1931.

[By CHAS. H. BEAUMONT, District Horticultural Instructor].

The main work for the month is the harvesting of the soft fruits. So far no improvement has been noticed; ripe and firm fruits are packed in a bushel box together and considerable loss is sure. Good fruit deserves careful packing. There will be few apples available for export, and every effort should be made to keep them of the highest quality; the fact that we have a small crop does not necessarily mean that anything will sell well, because there is plenty available in other States. This month should be the latest for irrigating. The control of codlin moth will be difficult, and the work of spraying will need extra care; those who are intending to use white oils should be careful to do the work in the early hours of the morning or on a cloudy day. Spraying of any kind may do considerable harm if carried out on a hot, sunny day. Curculio beetle is vigorous this year and must be checked or there will be a bigger number left for next year. Use arsenate of lead, strong dusts, or 1lb. of powder in 8galls. of water. This may be used on roses with best results. Orchardists troubled with woolly aphis should get the *Aphelinus mali* to work for them; most of the orchards have them now, and there should be no difficulty in procuring them.

Vines should be watched for oidium and downy mildew, especially if showers continue. Our usually dry climate has made us almost immune from downy mildew, but we are still liable to an attack should the weather become showery; the remedy or preventive is well known and is easily applied.

Young trees and vines should not be allowed to suffer from want of water. The soil should be loosened after irrigation and weeds kept down.



## DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on January 5th, 1931:—

**BUTTER.**—Since our last report the production of butter throughout the State has rapidly declined, and with consumption keeping up fairly well it has necessitated the importing of considerable quantities of choicest from the Eastern States. The London butter market has shown improvement during the last few weeks, and some of the later shipments from South Australia will benefit thereby; but except for the lower grades the season for exporting overseas is now finished from here. Values have firmed in this State, and at present are:—Choicest creamery fresh butter in bulk, 1s. 5½d.; prints and delivery extra; second and third grades, 1s. 3½d. (these prices are subject to stabilisation levies); best separators, 1s. 1d. to 1s. 3d.; well-conditioned store and collectors', 11d. to 12d. per lb.; heated and pastry, 10d.

**EGGS.**—As with other produce, the seasonal decline in quantities was noticeable in eggs, and, unfortunately, the quality at the end of the season is always adversely affected with the heat. More care is necessary in the counting and testing to effect sales, as a big proportion of the consignments is affected by staleness at this time of the year. Ordinary country lots, hen 5½d. per dozen; duck 6½d. per dozen; selected and infertile higher.

**CHEESE.**—The supplies of cheese are keeping up well, but the local and Western Australian demand is sufficient to clear all stocks, so that fair quantities are going into cold store for winter use. New makes, large to loaf, 6d. to 6½d. per lb.; semi-matured and matured, to 11d. per lb.

**ALMONDS.**—Fairly heavy quantities were marketed just prior to Christmas, but have since declined. Demand was well maintained, but has now eased. No change in prices was recorded. Brandis, 7½d. to 8d.; mixed softshells, 7d. to 7½d.; hardshells, 4d. to 4½d.; kernels, 1s. 6d. to 1s. 6½d. per lb.

**HONEY.**—Stocks of honey held in this State are heavy, and with the new season's "take" now being marketed in increasing quantities, the outlook is somewhat obscure. Sales are very limited, and all wholesalers and tinnerns are holding large stocks. Prime clear extracted in liquid condition, 3½d. to 3¾d.; best quality candied lots, 2½d. to 3½d.; second grade, 1½d. to 2d.

**BEESSWAX.**—Unaltered; 1s. 4½d. to 1s. 5½d. per lb., according to sample.

**BACON.**—Much better trade in bacon and hams was done at Christmas time than was anticipated, and many curers were unable to supply the whole of the orders for hams, so that considerable numbers were imported from the other States at the last moment. Since Christmas, however, the trade has shown an easing, and ample supplies are now available for all requirements. Best local sides, 9½d. to 10d.; best local factory-cured middles, 9d. to 9½d.; large, 7½d.; local rolls, 9½d. to 10d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 2d.; local hams, 1s. to 1s. 1d.; cooked, 1s. 3d.; "Sugar Cane" brand lard in packets 11d., in bulk 10d. per lb.; local lard, 10½d. per lb. in prints.

**LIVE POULTRY.**—The quantity of birds marketed this year was not so great as in other years, and it is probably due to the fact that farmers have retained laying hens to a greater extent than usual so as to obtain an income from the eggs. Since Christmas the numbers marketed have been very short, and we anticipate that a good demand will rule, as there is a steady demand maintaining. Prime roosters, 4s. 11d. to 6s. 3d.; nice-conditioned cockerels, 3s. 6d. to 4s. 9d.; fair-conditioned cockerels, 2s. 9d. to 3s. 4d.; chickens, lower; heavy-weight hens, 3s. 4d. to 4s. 3d.; medium hens, 2s. 6d. to 3s. 2d.; light hens, 2s. to 2s. 5d.; couple of pens of weedy sorts lower. Geese, 5s. to 6s.; prime young Muscovy drakes, 5s. to 6s. 6d.; ducks, good conditioned, 3s. 9d. to 4s. 9d.; ducks, fair conditioned, 2s. 3d. to 3s. 3d.; ducklings lower. Turkeys, good to prime condition, 1s. to 1s. 6d. per lb. live weight; turkeys, fair condition, 9d. to 11d. per lb. live weight; turkeys, fattening sorts, lower. Pigeons, 6d. each.

**POTATOES.**—New Western Australian Delawares, 5s. 6d. per cwt.

**ONIONS.**—Best white, 5s. per cwt.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of December, 1930, also the average precipitation to the end of December, and the average annual rainfall.

| Station.                          | For Dec. 1930. | To end Dec. 1930. | Av'ge Annual Rain-fall. |
|-----------------------------------|----------------|-------------------|-------------------------|
| <b>FAR NORTH AND UPPER NORTH.</b> |                |                   |                         |
| Oodnadatta .....                  | 1.51           | 5.92              | 4.72                    |
| Marree .....                      | 2.62           | 8.71              | 5.86                    |
| Farina .....                      | 1.33           | 7.67              | 6.46                    |
| Copley .....                      | 1.78           | 9.08              | 7.93                    |
| Beltana .....                     | 2.41           | 9.10              | 8.59                    |
| Blinman .....                     | 2.60           | 10.70             | 12.02                   |
| Hookina .....                     | 1.30           | 9.51              | 11.51                   |
| Hawker .....                      | 0.92           | 9.86              | 12.28                   |
| Wilson .....                      | .60            | 8.34              | 11.84                   |
| Gordon .....                      | 1.65           | 9.55              | 10.73                   |
| Quorn .....                       | 1.93           | 10.27             | 13.42                   |
| Port Augusta .....                | 1.88           | 8.75              | 9.43                    |
| Bruce .....                       | 0.99           | 8.49              | 9.94                    |
| Hammond .....                     | 0.55           | 8.14              | 11.41                   |
| Wilmington .....                  | 0.99           | 10.74             | 17.63                   |
| Willowie .....                    | 1.18           | 13.85             | 12.11                   |
| Melrose .....                     | 1.81           | 15.15             | 23.01                   |
| Booleroo Centre .....             | 1.26           | 12.19             | 15.26                   |
| Port Germein .....                | 1.36           | 11.60             | 12.47                   |
| Wirrabara .....                   | 1.82           | 15.45             | 19.34                   |
| Appila .....                      | 1.17           | 10.98             | 14.69                   |
| Cradoek .....                     | 1.36           | 9.77              | 10.87                   |
| Carrieton .....                   | 0.75           | 10.12             | 12.40                   |
| Johnburg .....                    | 1.05           | 10.16             | 10.64                   |
| Eurelia .....                     | 0.71           | 8.33              | 13.06                   |
| Orroroo .....                     | 1.88           | 10.83             | 13.28                   |
| Nackara .....                     | 1.63           | 11.41             | 11.16                   |
| Black Rock .....                  | 1.68           | 10.34             | 12.50                   |
| Oodlawirra .....                  | 1.46           | 11.06             | —                       |
| Peterborough .....                | 2.17           | 10.22             | 13.30                   |
| Yongala .....                     | —              | 13.24             | 14.46                   |

**NORTH-EAST.**

|                           |      |      |      |
|---------------------------|------|------|------|
| Yunta .....               | 1.71 | 7.24 | 8.46 |
| Waukaringa .....          | 1.07 | 5.88 | 8.06 |
| Mannahill .....           | 1.02 | 8.00 | 8.31 |
| Cockburn .....            | 1.93 | 6.89 | 7.93 |
| Broken Hill, N.S.W. ..... | 1.52 | 8.18 | 9.61 |

**LOWER NORTH.**

|                      |                   |       |       |
|----------------------|-------------------|-------|-------|
| Port Pirie .....     | 1.11              | 9.70  | 13.25 |
| Port Broughton ..... | 0.23              | 10.14 | 14.02 |
| Bute .....           | 0.17              | 10.90 | 15.48 |
| Laura .....          | 0.50              | 11.75 | 18.11 |
| Caltowie .....       | 0.51              | 11.35 | 16.85 |
| Jamestown .....      | 0.73              | 12.72 | 17.84 |
| Gladstone .....      | 0.48              | 12.29 | 16.40 |
| Crystal Brook .....  | 0.43              | 12.41 | 15.87 |
| Georgetown .....     | 0.43 <sup>1</sup> | 14.10 | 18.47 |
| Narridy .....        | 0.26              | 13.66 | 15.93 |
| Redhill .....        | 0.36              | 13.20 | 16.63 |
| Spalding .....       | 0.38              | 13.40 | 19.34 |
| Gulnare .....        | 0.25              | 15.48 | 18.74 |
| Yacka .....          | 0.33              | 13.65 | 15.35 |
| Koolunga .....       | 0.33              | 11.62 | 15.52 |
| Snowtown .....       | 0.24              | 11.99 | 15.70 |

| Station.                      | For Dec. 1930. | To end Dec. 1930. | Av'ge Annual Rain-fall. |
|-------------------------------|----------------|-------------------|-------------------------|
| <b>LOWER NORTH—continued.</b> |                |                   |                         |
| Brinkworth .....              | 0.33           | 12.12             | 15.85                   |
| Blyth .....                   | 0.32           | 12.32             | 16.86                   |
| Clare .....                   | 0.56           | 19.52             | 24.61                   |
| Mintaro .....                 | 1.41           | 20.13             | 23.43                   |
| Watervale .....               | 0.70           | 17.33             | 27.10                   |
| Auburn .....                  | 0.70           | 18.49             | 24.08                   |
| Hoyleton .....                | 0.79           | 11.66             | 17.44                   |
| Balaklava .....               | 0.31           | 11.18             | 15.61                   |
| Port Wakefield .....          | 0.32           | 8.83              | 13.04                   |
| Terowie .....                 | 1.66           | 9.53              | 13.47                   |
| Yarcowie .....                | 0.76           | 9.12              | 13.72                   |
| Hallett .....                 | 0.71           | 14.27             | 16.47                   |
| Mount Bryan .....             | 0.48           | 13.67             | 16.79                   |
| Koorunga .....                | 0.39           | 13.93             | 17.96                   |
| Farrell's Flat .....          | 0.67           | 13.67             | 18.75                   |

**WEST OF MURRAY RANGE.**

|                     |      |       |       |
|---------------------|------|-------|-------|
| Manoora .....       | 0.53 | 14.84 | 18.94 |
| Saddleworth .....   | 0.44 | 15.87 | 19.60 |
| Marrabel .....      | 0.60 | 17.52 | 19.87 |
| Riverton .....      | 0.76 | 16.66 | 20.81 |
| Tarlee .....        | 0.88 | 15.83 | 18.13 |
| Stockport .....     | 1.15 | 16.54 | 16.81 |
| Hamley Bridge ..... | 1.10 | 14.09 | 16.60 |
| Kapunda .....       | 0.58 | 16.76 | 19.85 |
| Freeling .....      | 0.43 | 14.26 | 17.95 |
| Greenock .....      | 0.62 | 17.56 | 21.68 |
| Truro .....         | 0.41 | 16.36 | 20.09 |
| Stockwell .....     | 0.89 | 18.70 | 20.18 |
| Nuriootpa .....     | 1.01 | 18.79 | 20.65 |
| Angaston .....      | 1.00 | 19.67 | 22.49 |
| Tanunda .....       | 0.61 | 17.23 | 22.12 |
| Lyndoch .....       | 0.55 | 19.02 | 23.58 |
| Williamstown .....  | 0.90 | 23.37 | 27.71 |

**ADELAIDE PLAINS.**

|                   |      |       |       |
|-------------------|------|-------|-------|
| Owen .....        | 0.65 | 14.46 | 13.91 |
| Mallala .....     | 0.56 | 12.77 | 16.67 |
| Roseworthy .....  | 0.59 | 14.98 | 17.38 |
| Gawler .....      | 0.50 | 14.20 | 19.06 |
| Two Wells .....   | 0.44 | 12.00 | 15.81 |
| Virginia .....    | 0.46 | 12.92 | 17.23 |
| Smithfield .....  | 0.77 | 14.36 | 17.51 |
| Salisbury .....   | 0.66 | 15.45 | 18.60 |
| Adelaide .....    | 0.91 | 18.65 | 21.12 |
| Glen Osmond ..... | 0.43 | 21.53 | 26.06 |
| Magill .....      | 0.98 | 21.02 | 25.61 |

**MOUNT LOFTY RANGES.**

|                     |      |       |       |
|---------------------|------|-------|-------|
| Teatree Gully ..... | 0.99 | 19.73 | 27.53 |
| Stirling West ..... | 2.05 | 40.80 | 46.90 |
| Uraidla .....       | 1.24 | 32.67 | 44.11 |
| Clarendon .....     | 1.27 | 25.91 | 32.91 |
| Morphett Vale ..... | 0.77 | 18.23 | 22.69 |
| Noarlunga .....     | 0.82 | 16.41 | 20.40 |
| Willunga .....      | 0.37 | 20.14 | 26.02 |
| Aldinga .....       | 0.39 | 15.33 | 20.25 |



## RAINFALL—continued.

| Station.                         | For<br>Dec.<br>1930. | To<br>end<br>Dec.<br>1930. | Av'ge<br>Annual<br>Rain-<br>fall. |
|----------------------------------|----------------------|----------------------------|-----------------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                      |                            |                                   |
| Myponga .....                    | 1.03                 | 25.70                      | 20.14                             |
| Normanville .....                | 0.28                 | 16.96                      | 20.73                             |
| Yankalilla .....                 | 0.26                 | 17.21                      | 22.95                             |
| Mount Pleasant ..                | 0.77                 | 22.74                      | 27.29                             |
| Birdwood .....                   | 0.85                 | 24.06                      | 29.28                             |
| Gumeracha .....                  | 0.82                 | 27.73                      | 33.45                             |
| Millbrook Reservoir              | 1.02                 | 26.59                      | 35.55                             |
| Tweedvale .....                  | 0.81                 | 29.97                      | 35.96                             |
| Woodside .....                   | 0.75                 | 25.34                      | 32.38                             |
| Ambleside .....                  | 0.81                 | 28.43                      | 35.02                             |
| Nairne .....                     | 0.60                 | 24.37                      | 28.22                             |
| Mount Barker ....                | 0.92                 | 32.01                      | 31.71                             |
| Echunga .....                    | 0.82                 | 24.38                      | 33.29                             |
| Macclesfield .....               | 0.86                 | 23.07                      | 30.62                             |
| Meadows .....                    | 0.93                 | 26.22                      | 36.34                             |
| Strathalbyn .....                | 0.43                 | 14.87                      | 19.41                             |

|                                 |      |       |       |
|---------------------------------|------|-------|-------|
| <b>MURRAY FLATS AND VALLEY.</b> |      |       |       |
| Meningie .....                  | 0.66 | 16.26 | 18.46 |
| Milang .....                    | 0.41 | 10.88 | 15.05 |
| Langhorne's Creek               | 0.37 | 13.26 | 14.80 |
| Wellington .....                | 0.25 | 11.91 | 14.64 |
| Tailem Bend .....               | 0.48 | 13.55 | 14.66 |
| Murray Bridge ...               | 0.12 | 9.94  | 13.76 |
| Callington .....                | 0.17 | 12.32 | 15.31 |
| Mannum .....                    | 0.71 | 10.46 | 11.53 |
| Palmer .....                    | 0.48 | 13.77 | 15.55 |
| Sedan .....                     | 0.36 | 11.78 | 12.16 |
| Swan Reach .....                | 0.62 | 9.49  | 10.65 |
| Blanchetown .....               | 0.36 | 8.83  | 11.14 |
| Eudunda .....                   | 1.37 | 16.80 | 17.13 |
| Sutherlands .....               | 0.41 | 10.82 | 10.79 |
| Morgan .....                    | 1.07 | 10.81 | 9.17  |
| Waikerie .....                  | 0.81 | 11.81 | 9.61  |
| Overland Corner ..              | 0.39 | 9.16  | 10.50 |
| Loxton .....                    | 0.91 | 12.53 | 11.60 |
| Renmark .....                   | 1.26 | 9.99  | 10.52 |

|                                |      |       |       |
|--------------------------------|------|-------|-------|
| <b>WEST OF SPENCER'S GULF.</b> |      |       |       |
| Eucla .....                    | 0.62 | 14.17 | 9.96  |
| Nullarbor .....                | 0.45 | 10.21 | 8.62  |
| Fowler's Bay .....             | 0.66 | 8.38  | 11.76 |
| Penong .....                   | 0.92 | 8.62  | 11.94 |
| Koonibba .....                 | 0.87 | 7.88  | 11.64 |
| Denial Bay .....               | 0.20 | 7.68  | 11.31 |
| Ceduna .....                   | 0.57 | 8.06  | 9.82  |
| Smoky Bay .....                | 0.10 | 6.15  | 10.44 |
| Wirrulla .....                 | 0.23 | 9.74  | —     |
| Streaky Bay .....              | 0.08 | 8.83  | 14.91 |
| Chandada .....                 | 0.19 | 10.21 | —     |
| Minnipa .....                  | 0.42 | 10.79 | 13.73 |
| Kyancutta .....                | 0.39 | 10.54 | —     |
| Talia .....                    | 0.04 | 9.62  | 14.76 |
| Port Elliot .....              | 0.26 | 10.27 | 16.47 |
| Yeelanna .....                 | 0.21 | 11.00 | 16.03 |
| Cummins .....                  | 1.24 | 13.01 | 17.77 |
| Port Lincoln .....             | 0.18 | 14.19 | 19.45 |
| Tumby .....                    | 0.15 | 10.58 | 14.14 |
| Ungarra .....                  | 0.33 | 13.98 | 16.83 |
| Carrow .....                   | 0.29 | 8.12  | 13.38 |
| Arno Bay .....                 | 0.30 | 11.19 | 12.46 |

|                                      |      |       |       |
|--------------------------------------|------|-------|-------|
| <b>WEST OF SPENCER'S GULF—contd.</b> |      |       |       |
| Rudall .....                         | 0.44 | 13.20 | 12.07 |
| Cleve .....                          | 0.38 | 15.09 | 14.61 |
| Cowell .....                         | 0.47 | 10.22 | 11.16 |
| Miltalie .....                       | 0.39 | 11.75 | 13.59 |
| Darke's Peak ..                      | 0.26 | 13.15 | 14.98 |
| Kimba .....                          | 0.19 | 11.75 | 11.50 |

|                         |      |       |       |
|-------------------------|------|-------|-------|
| <b>YORKE PENINSULA.</b> |      |       |       |
| Walleroo .....          | 0.74 | 11.46 | 13.94 |
| Kadina .....            | 0.75 | 11.29 | 15.71 |
| Moonta .....            | 1.27 | 12.53 | 15.10 |
| Paskeville .....        | 0.06 | 10.41 | 15.64 |
| Maitland .....          | 1.69 | 16.74 | 19.97 |
| Ardrossan .....         | 0.39 | 11.58 | 14.00 |
| Port Victoria ..        | 1.33 | 13.68 | 15.44 |
| Curramulka ....         | 1.50 | 16.12 | 17.92 |
| Minlaton .....          | 0.85 | 14.02 | 17.90 |
| Port Vincent ...        | 0.24 | 12.64 | 14.56 |
| Brentwood .....         | 0.84 | 12.93 | 15.52 |
| Stansbury .....         | 0.45 | 12.68 | 16.89 |
| Warooka .....           | 0.50 | 13.71 | 17.60 |
| Yorketown .....         | 0.42 | 14.63 | 16.98 |
| Edithburgh .....        | 0.27 | 11.92 | 16.44 |

|                              |      |       |       |
|------------------------------|------|-------|-------|
| <b>SOUTH AND SOUTH-EAST.</b> |      |       |       |
| Cape Borda ....              | 0.12 | 25.80 | 24.76 |
| Kingscote .....              | 0.45 | 21.77 | 19.05 |
| Penneshaw .....              | 0.29 | 18.00 | 18.65 |
| Victor Harbor ..             | 0.52 | 17.79 | 21.33 |
| Port Elliot .....            | 0.80 | 14.91 | 20.02 |
| Goolwa .....                 | 0.47 | 13.81 | 17.87 |
| Copeville .....              | 0.55 | 9.30  | 11.58 |
| Meribah .....                | 0.85 | 11.61 | 11.34 |
| Alawoona .....               | 0.49 | 10.47 | 9.98  |
| Mindarie .....               | 1.33 | 12.09 | 11.88 |
| Sandalwood .....             | 1.28 | 12.32 | 13.67 |
| Karoonda .....               | 0.82 | 14.00 | 14.37 |
| Pinnaroo .....               | 1.80 | 12.90 | 14.70 |
| Parilla .....                | 1.23 | 13.12 | 13.95 |
| Lameroo .....                | 1.88 | 15.41 | 16.19 |
| Parrakie .....               | 0.88 | 14.33 | 14.52 |
| Geranium .....               | 0.95 | 15.15 | 16.49 |
| Peake .....                  | 0.71 | 14.32 | 16.30 |
| Cooke's Plains ..            | 1.01 | 13.19 | 15.47 |
| Coomandook ...               | 0.85 | 13.94 | 17.34 |
| Coonalpyn .....              | 0.74 | 14.73 | 17.51 |
| Tintinara .....              | 1.44 | 15.50 | 18.81 |
| Keith .....                  | 1.49 | 17.41 | 17.93 |
| Bordertown .....             | 1.21 | 18.07 | 19.35 |
| Wolseley .....               | 1.57 | 19.91 | 18.41 |
| Frances .....                | 3.66 | 23.56 | 19.94 |
| Naracoorte .....             | 2.47 | 24.64 | 22.58 |
| Penola .....                 | 1.10 | 25.65 | 26.15 |
| Lucindale .....              | 1.18 | 25.13 | 23.07 |
| Kingston .....               | 0.75 | 22.54 | 24.37 |
| Robe .....                   | 1.64 | 27.87 | 24.61 |
| Beachport .....              | 2.41 | 28.90 | 26.97 |
| Millicent .....              | 2.71 | 31.03 | 29.79 |
| Kalangadoo .....             | 2.25 | 31.81 | 32.34 |
| Mount Gambier ..             | 1.25 | 23.33 | 30.74 |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

| Branch.                 | Report on Page. | Dates of Meetings. |      | Branch.                         | Report on Page. | Dates of Meetings. |      |
|-------------------------|-----------------|--------------------|------|---------------------------------|-----------------|--------------------|------|
|                         |                 | Jan.               | Feb. |                                 |                 | Jan.               | Feb. |
| Alawoona .....          | 684             | —                  | —    | Budunda.....                    | 676             | 5                  | 2    |
| Aldinga .....           | *               | —                  | —    | Eurelia .....                   | 665             | 2                  | 14   |
| Allandale East .....    | *               | —                  | —    | Eurelia Women's .....           | 665             | 7                  | 4    |
| Alma .....              | *               | —                  | —    | Everard East .....              | †               | —                  | —    |
| Amyton .....            | *               | —                  | —    | Farrell's Flat .....            | †               | 30                 | 27   |
| Angaston .....          | *               | —                  | —    | Finniss .....                   | *               | —                  | —    |
| Appila .....            | *               | —                  | —    | Gawler River .....              | *               | —                  | —    |
| Appila-Yarrowlie .....  | 664             | R                  | 6    | Georgetown .....                | †               | 3                  | —    |
| Arthurton .....         | *               | —                  | —    | Geranium .....                  | *               | 31                 | —    |
| Ashbourne .....         | †               | —                  | —    | Gladstone .....                 | *               | 2                  | —    |
| Auburn .....            | —               | —                  | —    | Gladstone Women's .....         | 666             | 9                  | 13   |
| Auburn Women's.....     | 669             | 30                 | 27   | Glencoe .....                   | *               | 13                 | 10   |
| Balaklava .....         | *               | R                  | 23   | Glossop .....                   | *               | —                  | —    |
| Balhannah .....         | *               | —                  | —    | Goode .....                     | *               | R                  | 5    |
| Baramba .....           | *               | —                  | —    | Goode Women's .....             | 680             | —                  | —    |
| Beetaloo Valley .....   | *               | R                  | 2    | Greenock .....                  | †               | 8                  | 9    |
| Belalie North .....     | *               | R                  | 2    | Green Patch .....               | 680             | —                  | —    |
| Belalie Women's .....   | *               | —                  | —    | Gulnare .....                   | —               | —                  | —    |
| Berri .....             | 684             | 7                  | 4    | Gumeracha .....                 | 688             | —                  | 2    |
| Big Swamp .....         | —               | —                  | —    | Halidon .....                   | *               | —                  | —    |
| Blackheath .....        | †               | 8                  | 5    | Hanson .....                    | *               | —                  | —    |
| Black Rock .....        | 665             | R                  | 3    | Hartley .....                   | *               | 28                 | —    |
| Black Springs .....     | 670             | —                  | —    | Hawker .....                    | *               | 6                  | 3    |
| Blackwood .....         | 688             | 12                 | 9    | Hookina .....                   | *               | —                  | —    |
| Block E .....           | *               | —                  | —    | Hoyleton .....                  | 676             | 19                 | 16   |
| Blyth .....             | 666             | 16                 | 20   | Imman Valley .....              | 688             | 15                 | 19   |
| Boooleroo Centre .....  | —               | 2                  | —    | Ironbank .....                  | *               | —                  | —    |
| Booolgun .....          | 685             | —                  | —    | Jamestown .....                 | *               | R                  | 18   |
| Boora Plains .....      | †               | 8                  | —    | Kalangadoo Women's .....        | *               | 10                 | 14   |
| Borrika .....           | †               | —                  | —    | Kalangadoo .....                | *               | 13                 | 10   |
| Bowhill .....           | †               | —                  | —    | Kalyan .....                    | *               | R                  | 18   |
| Brentwood .....         | —               | —                  | 5    | Kangarilla .....                | *               | —                  | —    |
| Brinkley .....          | 686             | —                  | —    | Kangarilla Women's .....        | *               | R                  | R    |
| Brinkworth .....        | 671             | —                  | 2    | Kanmantoo .....                 | *               | —                  | —    |
| Brownlow .....          | 671             | —                  | —    | Kanni .....                     | *               | —                  | —    |
| Buchanan .....          | †               | R                  | —    | Kapinnie .....                  | †               | —                  | —    |
| Bugle .....             | *               | 13                 | 10   | Kapunda .....                   | †               | 9                  | 13   |
| Bundaleer Springs ..... | *               | —                  | —    | Karcuitaby .....                | *               | —                  | —    |
| Bunora .....            | *               | 4                  | 8    | Karoonda .....                  | *               | 7                  | 4    |
| Bute .....              | *               | 15                 | 19   | Keith .....                     | *               | —                  | —    |
| Butler .....            | —               | —                  | —    | Kelly .....                     | *               | 3                  | —    |
| Calca .....             | 679             | —                  | —    | Ki Ki .....                     | *               | —                  | —    |
| Calpell .....           | *               | —                  | —    | Kilkerran .....                 | *               | —                  | —    |
| Calph .....             | *               | 6                  | 3    | Kongorong .....                 | *               | —                  | 2    |
| Calowie .....           | *               | —                  | —    | Koolunga .....                  | 666             | —                  | —    |
| Canowie Belt .....      | —               | —                  | —    | Koonibba .....                  | —               | —                  | —    |
| Caralua .....           | 679             | —                  | —    | Koonunga .....                  | 666             | —                  | —    |
| Carrow .....            | *               | —                  | —    | Kopple .....                    | 681             | —                  | —    |
| Chandada .....          | *               | —                  | —    | Kringin .....                   | *               | 5                  | 2    |
| Charra .....            | *               | —                  | —    | Kulkawirra .....                | *               | 13                 | 10   |
| Cherry Gardens .....    | *               | —                  | —    | Kyancutta .....                 | *               | R                  | 3    |
| Cianfield .....         | *               | —                  | —    | Kybybolite .....                | *               | R                  | 3    |
| Clare .....             | 672             | 6                  | 3    | Lameroo .....                   | †               | 3                  | —    |
| Clarendon .....         | *               | R                  | 2    | Langhorne's Creek .....         | *               | —                  | —    |
| Cleve .....             | 680             | —                  | 5    | Laura .....                     | *               | 3                  | —    |
| Cobdogla .....          | —               | —                  | —    | Laura Bay .....                 | *               | 13                 | 10   |
| Colile .....            | 680             | 7                  | 4    | Lenswood and Forest Range ..... | *               | —                  | —    |
| Colton .....            | —               | —                  | —    | Light's Pass .....              | †               | —                  | 2    |
| Coomandook .....        | 686             | 30                 | 27   | Lipson .....                    | †               | 3                  | —    |
| Coomalpyne .....        | *               | —                  | —    | Lone Gum and Monash .....       | *               | —                  | —    |
| Coomawarra .....        | *               | —                  | 5    | Lone Pine .....                 | *               | —                  | —    |
| Coorabie .....          | —               | —                  | —    | Longwood .....                  | *               | —                  | —    |
| Copeville .....         | 686             | —                  | —    | Lowbank .....                   | 686             | —                  | —    |
| Coults .....            | *               | —                  | —    | Loxton .....                    | *               | 9                  | 18   |
| Cradock .....           | *               | —                  | —    | Lucindale .....                 | *               | —                  | —    |
| Cumgens .....           | *               | —                  | —    | Lyndoch .....                   | †               | —                  | 3    |
| Currency Creek .....    | *               | 5                  | 2    | McLaren Flat .....              | †               | —                  | —    |
| Cygnet River .....      | *               | —                  | —    | MacGillivray .....              | *               | —                  | 3    |
| Darke's Peak .....      | *               | —                  | —    | Mallala .....                   | *               | 19                 | 16   |
| Dudley .....            | *               | —                  | —    | Mattee .....                    | †               | —                  | —    |
| Edinville .....         | *               | —                  | —    | Mangalo .....                   | †               | —                  | —    |
| Elbow Hill .....        | 680             | 6                  | 10   | Mannanarie .....                | *               | R                  | —    |



## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

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|----------------------------|-----------------|--------------------|------|------------------------------|-----------------|--------------------|------|
|                            |                 | Jan.               | Feb. |                              |                 | Jan.               | Feb. |
| Marama .....               | 686             | R                  | R    | Roberts and Verran .....     | 682             | —                  | —    |
| Meadows .....              | •               | —                  | —    | Rockwood .....               | •               | 5                  | 2    |
| Meribah .....              | •               | 12                 | 9    | Rosedale .....               | •               | —                  | —    |
| Milang .....               | •               | R                  | 14   | Roseworthy .....             | •               | —                  | —    |
| Millicent .....            | •               | R                  | —    | Rosy Pine .....              | •               | —                  | —    |
| Millicent .....            | •               | 30                 | 27   | Rudall .....                 | •               | —                  | 3    |
| Millicent Women's .....    | 662             | —                  | —    | Saddleworth .....            | •               | 2                  | 6    |
| Miltalie .....             | •               | R                  | —    | Saddleworth Women's .....    | 677             | 6                  | 3    |
| Mindarie .....             | •               | —                  | 6    | Salisbury .....              | •               | 13                 | 10   |
| Minnipa .....              | •               | —                  | —    | Salt Creek .....             | •               | —                  | —    |
| Modbury .....              | •               | —                  | —    | Sandalwood .....             | •               | —                  | —    |
| Monarto South .....        | •               | —                  | —    | Scott's Bottom .....         | •               | 3                  | —    |
| Moonta .....               | •               | —                  | —    | Shoal Bay .....              | †               | —                  | 3    |
| Moorlands .....            | †               | R                  | R    | Smoky Bay .....              | •               | 3                  | 7    |
| Moorook .....              | •               | —                  | —    | Snowtown .....               | •               | 9                  | 13   |
| Morchard .....             | •               | —                  | —    | South Kilkerran .....        | 679             | —                  | 3    |
| Morphett Vale .....        | •               | 2                  | —    | Spalding .....               | •               | —                  | —    |
| Mount Barker .....         | •               | —                  | —    | Springton .....              | •               | R                  | 4    |
| Mount Bryan .....          | •               | —                  | —    | Stirling .....               | •               | —                  | —    |
| Mount Compass .....        | •               | —                  | 6    | Stockport .....              | •               | —                  | —    |
| Mount Gambier .....        | •               | 9                  | 13   | Strathalbyn .....            | †               | —                  | —    |
| Mount Hope .....           | •               | —                  | 3    | Streaky Bay .....            | 683             | 23                 | 27   |
| Mount Pleasant .....       | 691             | —                  | —    | Tallem Bend .....            | •               | 8                  | 5    |
| Mount Remarkable .....     | •               | †                  | —    | Talia .....                  | 683             | 30                 | 27   |
| Mount Schank .....         | •               | —                  | —    | Tantanoola .....             | †               | 3                  | 7    |
| Mudamuckla .....           | •               | 10                 | 14   | Taplan .....                 | 688             | R                  | R    |
| Mundalla .....             | †               | R                  | 5    | Taragoro .....               | 683             | 29                 | 26   |
| Murray Bridge .....        | •               | —                  | —    | Tarcowie .....               | •               | —                  | —    |
| Murraytown .....           | •               | R                  | —    | Tarlee .....                 | •               | —                  | —    |
| Mypolonga .....            | •               | —                  | —    | Tatiana .....                | •               | —                  | —    |
| Myria .....                | •               | —                  | —    | Thrington .....              | 679             | —                  | —    |
| Nantawarra .....           | •               | —                  | —    | Tintinara .....              | 663             | —                  | —    |
| Naracoorte .....           | •               | 10                 | 14   | Truro .....                  | •               | 12                 | 9    |
| Narriby .....              | •               | R                  | 7    | Tulkinera .....              | •               | —                  | 5    |
| Narrung .....              | •               | —                  | —    | Tweedvale .....              | •               | —                  | 5    |
| Nelshaby .....             | •               | —                  | —    | Two Wells .....              | •               | —                  | —    |
| Nelshaby Women's .....     | 666             | 1                  | 26   | Ungarra .....                | •               | 8                  | 5    |
| Netherton .....            | •               | R                  | R    | Upper Wakefield .....        | 679             | —                  | —    |
| New Residence .....        | †               | —                  | —    | Urailda and Summertown ..... | •               | R                  | R    |
| North Booborowie .....     | •               | —                  | 2    | Vetch .....                  | •               | —                  | —    |
| Nunjikompta .....          | •               | —                  | —    | Virginia .....               | •               | —                  | —    |
| Nunkeri .....              | •               | —                  | —    | Walkerie .....               | †               | 9                  | 13   |
| O'Loughlin .....           | •               | 12                 | 9    | Wallala .....                | 683             | 14                 | 11   |
| Ororoo .....               | •               | —                  | —    | Wanbi .....                  | •               | 28                 | 25   |
| Overland Corner .....      | •               | R                  | 3    | Wandearah .....              | 668             | —                  | —    |
| Owen .....                 | 676             | 2                  | —    | Warcowie .....               | 665             | R                  | R    |
| Palable .....              | •               | —                  | —    | Warramboos .....             | •               | —                  | 3    |
| Parilla .....              | •               | R                  | 17   | Wasleys .....                | •               | 8                  | 12   |
| Parilla Women's .....      | 687             | 16                 | 20   | Wasleys Women's .....        | 678             | —                  | 5    |
| Parilla Well .....         | •               | 5                  | 2    | Watervale .....              | •               | —                  | —    |
| Parilla Well Women's ..... | 688             | 27                 | 24   | Wauratie .....               | •               | —                  | 3    |
| Parrakie .....             | •               | —                  | —    | Weavers .....                | •               | 12                 | 9    |
| Parrakie Women's .....     | 688             | 27                 | 24   | Wepowie .....                | †               | —                  | 2    |
| Paruna .....               | •               | R                  | 6    | White's River .....          | •               | 13                 | 10   |
| Paskeville .....           | 678             | R                  | 3    | Whyte-Yarcowie .....         | •               | —                  | —    |
| Pata .....                 | •               | 2                  | 6    | Wilkawatt Women's .....      | 688             | —                  | —    |
| Penneshaw .....            | •               | —                  | —    | Williamstown Women's .....   | 678             | 7                  | 4    |
| Penola .....               | •               | 3                  | 7    | Williamstown .....           | •               | —                  | —    |
| Penwortham .....           | †               | —                  | —    | Willowie .....               | •               | R                  | 23   |
| Petersville .....          | •               | —                  | 3    | Wilmington .....             | •               | 20                 | 17   |
| Petina .....               | •               | 24                 | 28   | Windsor .....                | •               | —                  | —    |
| Pimbong .....              | 681             | —                  | —    | Wirrabara .....              | •               | —                  | —    |
| Pinkawillie .....          | 681             | —                  | —    | Wirrilla .....               | •               | R                  | R    |
| Pinnaroo .....             | •               | —                  | —    | Wirrilla Women's .....       | 683             | 8                  | 5    |
| Pinnaroo Women's .....     | 686             | R                  | 6    | Wirrulla .....               | •               | R                  | 28   |
| Poochera .....             | •               | —                  | —    | Wolsley .....                | •               | 12                 | 9    |
| Port Elliot .....          | •               | R                  | 21   | Wudinna .....                | •               | —                  | —    |
| Pygery .....               | 682             | 3                  | —    | Wynarka .....                | •               | —                  | —    |
| Quorn .....                | •               | —                  | —    | Yacka .....                  | •               | —                  | —    |
| Ramoo .....                | •               | —                  | 2    | Yadnarie .....               | •               | —                  | 3    |
| Rapid Bay .....            | •               | 8                  | 15   | Yallunda Flat .....          | •               | —                  | —    |
| Redhill .....              | •               | —                  | —    | Yandiah .....                | •               | R                  | 13   |
| Rendelsham .....           | 662             | —                  | 28   | Yaninee .....                | •               | —                  | —    |
| Renmark .....              | •               | —                  | —    | Yantanable .....             | •               | —                  | —    |
| Rhynde .....               | •               | —                  | —    | Yeelanna .....               | •               | —                  | —    |
| Richman's Creek .....      | •               | —                  | —    | Yorketown-Melville .....     | •               | —                  | —    |
| Riverton .....             | 677             | R                  | R    | Youghusband .....            | •               | —                  | —    |
| Riverton Women's .....     | •               | —                  | —    | Yurzo .....                  | •               | —                  | —    |

No report received during the month of November.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### SOUTH-EAST DISTRICT.

MILLICENT WOMEN'S (Average annual rainfall, 29.70in.).

October 17th.—Present: 16 members.

Interesting reports on the Annual Congress were submitted by Mesdames Altschwager and Vareol.

**DIETS IN THE HOME.**—Mrs. L. Oberlander read the following paper at the meeting held on November 21st:—"Water is an essential factor in the daily diet. It has several functions to perform, one being to flush out the system and to remove impurities from the blood. It is a good plan to commence the day by drinking a glass of pure water, and to drink between meals, and also to have a glass of water last thing at night on retiring. I have practised this habit nearly all my life, and can testify to the fact that it has not done any harm, whatever the benefits derived may be. One cannot lay down a fast rule for all to follow as regards diet—some people suffer distress on partaking of eggs or oatmeal, while too much sugary or starchy food is possibly bad for others. It is, therefore, essential to have a reasonable balance in the diet of proteins and fats. If vegetables and fruit are used in the daily diet a normally healthy person should benefit accordingly."

#### RENDELSHAM.

September 6th.—Present: 14 members.

**CARE OF THE LAMBING FLOCK.**—Mr. C. Faehrmann read the following paper:—"During the gestation period (which is from 140-147 days in the ewe), as with all pregnant animals, the main food needed by the ewe is proteins and mineral salts in order to meet the body formation and requirements of the young lamb. Proteins build blood, nerve, brain, bone, muscle, wool, hoofs, &c.; mineral salts, bodily heat and fat. Ewes deprived of proteins will rob their own body systems to supply the needs of the young lamb. The result of this is unhealthy lambings, dead lambs, loss of ewes at lambing, poor milk supply in ewes, and consequently malnutrition or loss of lambs before weaning. During the gestation period and after lambing a daily ration of about 20ozs. of linseed sheep nuts (linseed cake broken into nut form) to breeding ewes increases lambing percentages, makes lambs stronger constitutionally and better able to withstand marking and attacks of disease, enhances the milk flow in ewes, and also aids wool growth. *Percentages of Lambing.*—Our lambing figures do not compare favorably with those of Great Britain, where the average sheep-farmer expects at least 100 per cent., and often reaches 150 per cent., while many of the flocks average 120 per cent. year after year. These figures are the more striking when we compare our weather conditions with those of England. Our season is in mild or warm weather, while that of Great Britain is about freezing point. The English methods entail much more labor than is generally necessary with Australian flocks:—1. The English-bred ewe is more prolific, therefore we should endeavor to breed crossbred ewes to get best results. 2. The English farmer is more particular in the use of sufficient rams and more readily rejects old and stale rams. 3. He arranges shelters for lambing ewes and has a shepherd in constant attendance. This shows that certain precautions are necessary to avoid needless losses. *The Care of the Ewe.*—Ewes should be handled with great care. Do not allow badly-bred and badly-trained dogs to rush the sheep about. A good quiet dog will help to quieten the sheep and should be trained to work well out of the flock. Any rough animal should not be used. *Lambing Paddock.*—It is a good plan, if possible, to arrange for a field near the homestead for a lambing paddock. The paddock should be well grassed, with native pasture for preference, well drained, and dry and clean underfoot. If possible, windbreaks should be in existence. Planting of trees on the windward side of the paddock, and, in fact, all of the stock paddocks should have breaks planted for the comfort of the stock generally. Usually, it is advisable to divide the flock before



lambing, picking the ewes which are likely to lamb early. The picking of sheep heavy in lamb can usually be done by feeling the udders of the ewes. At the same time, great care should be taken not to roughly handle the ewe when doing this. Under our conditions it is not usual to have a man specially engaged for care of the lambing ewe, nor is it absolutely necessary. With the paddock as close as possible to the homestead and the services of a good hack, one man can usually attend to 500 ewes in about three hours, providing the weather is mild. He should go around the flock twice a day, keeping a sharp look out for ewes which are about to lamb. It is not wise to interfere too early, as Nature will right itself, and damage is often done by interfering. It is much wiser to leave a ewe and return to her an hour or so later. *Assisting the Ewe.*—If assistance is required, it should be done with care. The normal presentation is the forefeet, followed by the nose, and with this, little difficulty is experienced. Often, however, presentation is at fault, and then difficulty arises. Should any great difficulty be encountered, the lamb should be gently pushed back into the womb, turned around, thus correcting the position, and then, as in normal cases, proceed to gently draw the lamb downwards and outwards. It is a cruel procedure to attempt to draw a wrongly presented lamb, and should, therefore, be avoided. Experience will teach a man thoroughly. Nature provides plenty of room for the turning of the lamb in the womb, and hence little difficulty will be encountered if this is done. Cleanliness must be observed, and it is a good plan to anoint the ewe with carbolic oil. If a ewe will not take the lamb, a good plan is to tie her up or pen her in a small yard with the lamb. Perhaps the ewe will have to be held for the lamb to obtain a drink. Another good plan which has proved successful is to smear the lamb with the ewe's milk and also smear the ewe's nose with her own milk, to which a little bran has been added, to the lamb and the ewe. A motherless lamb may be placed on a ewe which has lost her lamb by adopting the above methods. During rough weather it is advisable to carry a small bottle of olive oil or a small bottle of brandy. Often a little olive oil will revive a weak lamb. Bringing a lamb into a warm room will often help to revive it. Should the ewe be lost, it is a good plan to thoroughly wash the lamb in a bath of water at a temperature of about 102 degrees and thoroughly dry and wrap in a warm covering. As the lamb does not get the 'colostrum' milk of the ewe, the nearest approach is cow's milk—half pint fed through a bottle and teat. Add to the cow's milk one teaspoonful of sugar and the white of one egg per day to supply the extra albumen that is in the colostrum milk of the ewe. Lambing pens have been found useful in wet districts. A yard one chain square is large enough for from 200 to 300 ewes. This yard should contain a small haystack, where the ewes will be able to nibble and also keep themselves dry underfoot. Lambing pens also encourage ewes to feed from troughs should this be necessary. This shelter should prove useful on the farm for other stock during the part of the year when not used for lambing. *Tailing Lambs.*—This should be done while the lambs are young. It is not advisable to wait until all the lambs have been dropped, especially if the lambing is a protracted one. The best age is about two weeks. *Tailing.*—The knife—this is quickest and easiest and the stump heals more quickly than after the searing-iron. There is some risk, however, of the lamb bleeding to death. Much bleeding can be prevented if the lambs are tailed in cool weather and the flock should be rested both before and after tailing. The searing-iron stops bleeding almost entirely. It has a tendency to cause a scab, and does not heal so quickly as the knife. The iron should be kept at an even heat; a white-hot iron will often injure the bone with fatal results. Lambs should be done young. Another method is to cut with a knife and sear the main artery with the iron. This stops bleeding without forming a scab. Earmarking should be done at the same time as tailing, and every farm should have a distinctive earmark. Ewes and lambs should be pastured on some prepared crop of either rape or barley. It is advisable to change the paddocks as often as possible, i.e., daily instead of, say, once a week. A good plan is to let sheep feed on ordinary pasture through the night and morning and turn on to, say, rape in the afternoon. This allows them to gain much more feeding value. Care should be exercised in the detection of scouring, and if such should occur, concentrates, such as crushed barley or oats, are helpful. If a lamb is to be sold at four to four and a half months it is much better to sell direct from the mother. If the object is to sell a 50lb. to 60lb. lamb, which means holding the lamb for six months, then weaning is probably the better method." Mr. Faehrmann also read a paper on the keeping of pigs as a side line. (Secretary, Mr. F. White.)

#### TINTINARA (Average annual rainfall, 18.78in.).

The monthly meeting of the Branch was held on August 30th, there being present 10 members and visitors. Mr. E. S. Alcock (District Agricultural Instructor) delivered an address, "Top Dressing and Fodder Conservation." (Secretary, Mr. B. Fotheringham.)



## UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APPILA-YARROWIE (Average annual rainfall, 15.01in.).

September 5th.—Present: 15 members and visitors.

**THE PRODUCTION OF PROFITABLE SHEEP.**—Mr. W. Lange contributed the following paper:—"There are few countries in the world so dependent on primary products for their livelihood as Australia. Nevertheless, it is a well-known fact that the Australian wheat is regarded as one of the finest milling wheats produced anywhere in the world. Having this distinction, with the aid of favorable circumstances and improved farming methods, it should next be our aim to raise the products of our pastures to a similar extent at a reasonable cost of production. This would mainly represent wool, beef, and fat lambs. To achieve this aim of both quality and quantity, from our restricted rainfall areas, we should first direct our attention to improving the breed and then the feed, as these are two of the main factors leading towards success. A well-bred animal requires little more feed than a weedy one, but the return value is almost double.

*Usefulness of Various Breeds:* Merinos should be grown for quality of wool, have a large frame, and carry a staple of at least 3in. to 3½in. The wool should be clean, sound, and of a 64's quality. The Merino should have clean points, clean face with a good crop of wool extending down the centre of the head a little past the eyes, but not interfering with them. This breed generally proves the most profitable for all-round farm use. Lincoln is one of the largest sheep, has the heaviest and longest wool, and consequently it carries the heaviest fleece. Romney Marsh is the most suitable for very wet marshy or awampy countries. For the districts south of Adelaide a very profitable line is the longwool crossed with the Merino. Two good strains for this are the Border or English Leicester. A cross of this kind reduces the fleece value by approximately 2s. 6d., but this can readily be made up by extra weight in fat lambs.

*Feed.*—The correct feeding of sheep is a very important matter if maximum returns are desired. For best results sheep should have a nourishing and comparatively even amount of feed all the year. The quantity and quality of the feed affects the staple of the wool considerably. If sheep are taken from good pastures and starved for a couple of days and then put back again, it may cause them to lose their wool entirely, or at least make it very unsound. In some months during the year feed is more plentiful than at others. To overcome this defect, I should like to suggest an item that has received very little consideration by many farmers in this district, that is top-dressing. *Top-dressing.*—Why should not super have the same beneficial effect on fodder crops as it has on cereal crops in normal years. For top-dressing, I should suggest pasture land that has an established growth of foddery and herbage, under reasonable circumstances, and a rainfall of, say, 11ins. or over. It has many points in its favor. A few are:—The quantity and quality is increased; a number of natural grasses little seen in normal years soon make their appearance, do well, and spread over the pasture; whilst other kinds, like silvergrass, which is generally disregarded by the stock, is then readily eaten. More lime-phosphate is supplied to the stock by fertilised plants, and a greater amount of protein is available from the increased growth of legumes, such as lucerne, clover, &c. From personal experiments carried out in the form of grazing plots, dressed with 50, 100, 150, 200, and 400lbs. per acre; each of these plots has received an annual dressing the last four years, results have been remarkable. Another two plots were laid out five years ago, and neither have been grazed. One plot is no manure, whilst the other received an annual dressing equivalent to 2,985lbs. of 45 per cent. super per acre. The result has been a real surprise. It is now producing more than tenfold the fodder, and of a superior quality to that of the untreated plot. I do not wish to maintain that a heavy dressing of this kind is very profitable, nevertheless it shows the influence super has on foddery. If top-dressing is handled right it should help to solve some of our feed problems.

*Shearing.*—See that only careful persons are employed; rough handling, etc., not only affects the value, if sold immediately after shearing, it also causes pain to the sheep, and there is a danger of germs entering through the wounds of the sheep.

*Skirting.*—This should be done as lightly as possible, only removing the tips of the legs, neck, breech, sweaty edges, or any other part the operator deems necessary.

*Classing.*—Make all lines as even as possible, by casting out all the inferior fleeces, such as extra heavy, discolored, kempy, matted, very short, very tender, and extra strong. These lines reduce the sale value of the good fleeces. With small flocks it is often more profitable to let the broker do the reclassing, but before sending away be sure all bales are branded correctly, both top and front. *Culling* is generally easiest accomplished if the breeder can watch the sheep on the shearing-board and mark all those producing poor or inferior fleeces or possessing any other fault; these he can then fatten and



dispose of. *Mating*.—By careful culling and always attempting to use the one strain of rams, the breeder should soon obtain a very uniform flock. Rams should not be kept too long, because after five or six years they have a tendency to get slow, and also lack fertility, and this means a low percentage of lambs. Some breeders make it a practice to include a few young rams towards the end of the season. This 'liven's up' the old ones, and the young ones have a small season to start with.' (Secretary, Mr. F. Wurst.)

#### BLACK ROCK (Average annual rainfall, 12.57in.).

August 26th.—Present: 12 members.

*CARE OF MACHINERY*.—In reading a paper on this subject, Mr. J. Hurst said the low price of farm produce and the high cost of all farm implements made it very necessary that every care should be exercised with all farm machinery. The first essential was to see that all nuts and bolts were kept tight, and to see that all moving parts were well oiled and greased. Good shelter for all implements containing any woodwork should be provided. After harvest all worn out or broken parts should be replaced. If left until next season there was the danger of their replacement being overlooked when operations commenced for the next season. With so much machinery to keep in good repair, a well equipped blacksmith would prove of very material assistance. He suggested the use of a link for the centre of swings rather than an eyebolt, the latter had a tendency to weaken the swing. An occasional coat of paint to the woodwork would be a good investment, it would considerably lengthen the life of the implement or vehicle. The wheels should be kept in good order, especially the tyres. Wire, whilst an excellent friend in time of need, was too frequently made to serve the purpose of a permanent repair. Small tools, such as bars, picks, shovels, &c., should be returned to their place in the shed after use. (Secretary, Mr. R. Kitto.)

#### EURELIA (Average annual rainfall, 13.14in.).

Meeting held September 3rd. Mr. C. Stott presided over an attendance of 10 members and visitors. Members discussed the papers which were read at the Upper Northern Conference. (Secretary, Mr. E. Wall.)

#### EURELIA WOMEN'S (Average annual rainfall, 13.14in.).

Twelve members attended the meeting held on October 1st, when an excellent report of the Adelaide Congress was tendered by the delegates who represented the Branch. (Secretary, Mrs. E. Wall.)

#### WABCOWIE (Average annual rainfall, 12.16in.).

September 2nd.—Present: 11 members and four visitors.

*FENCING*.—The meeting was held at the residence of Mr. H. Jarvis. Mr. W. Crossman read the following paper:—"A good boundary fence should be made with wire netting, the posts being 5ft. 6in. long and 20in. in the ground, and spaced 5yds. apart. The strainers should be 7ft. long, and 30in. in the ground, and about five chains apart. This, with a 3ft. 6in. netting, 4in. in the ground, and a barbed wire 8in. above, would make a fence 3ft. 10in. high. A good sheep-proof fence of six wires could be made of posts 5ft. 2in. long, 20in. in the ground; strainers 6ft. 8in. long, 30in. in the ground; the wires being as follows:—First, 6in. above the ground; second, 6in. above first; third, 6in. above second; fourth, 6in. above third; fifth, 8in. above fourth; and sixth, 10in. above fifth wire. This would make a height of 3ft. 6in. For a five-wire sheep-proof

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fence posts should be 5ft. long and strainers 6ft. 6in. long, and in the ground 20in. and 30in. respectively; the wire spaces being 6½in., 6½in., 7in., 9in., and 11in., the height being 3ft. 4in. For a dog-proof fence it was not advisable to erect one under 6ft. high. This should have a 3ft. 6in. netting on the bottom and 3ft. on the top, the bottom being 6in. in the ground. It was a good plan to leave the posts 6in. to a foot higher in case one needed to put a barb or two on top to make it higher." A good discussion followed, and Mr. G. Hilder thought 1ft. netting lying on the outside of the fence was a splendid thing for keeping dogs from getting in. (Secretary, Mr. W. Crossman.)

## MIDDLE-NORTH DISTRICT.

### (PETERBOROUGH TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.94in.)

There was a large attendance of members and visitors on the occasion of the annual meeting which was held on August 26th, when addresses were delivered by Messrs. W. J. Spafford and W. C. Johnston of the Department of Agriculture. (Secretary, Mr. L. Mugge.)

GLADSTONE WOMEN'S (Average annual rainfall, 16.44in.).

The meeting of September 5th was held at the residence of Mrs. Spotswood. Musical and elocutionary items were rendered by Mrs. Pritchard and Mrs. Randle. (Secretary, Miss M. J. Sargent.)

GLADSTONE WOMEN'S (Average annual rainfall, 16.44in.).

December 12th.—Present: 20 members and two visitors.

CAKE COMPETITION.—In the cake competition for the trophy to be presented at the next annual meeting, the judges—Mesdames Destree and Sandow—made the following award of points:—Mrs. Gravestock, 50; Miss Sargent, 49; Mrs. Smallacombe, 48; Mrs. Hackworth, 47; Mrs. W. Thomas, 46; Mrs. O. Lines, 45½; Mrs. R. Lines, 45; Miss Porter, 45; Miss Brown, 44. (Secretary, Miss M. J. Sargent.)

### KOONUNGA.

Meeting held August 5th. Present: 22 members. Addresses were delivered by Messrs. W. Brownrigg and W. Johnston of the Department of Agriculture. (Secretary, Mr. G. Cartwright.)

KOOLUNGA (Average annual rainfall, 15.61in.).

Meeting held September 2nd. Present: Mr. H. Spencer (Chair) and 14 members. The Secretary, Mr. E. Le Page, read a lengthy paper, "Grain for Market and Marketing." A keen and interesting discussion followed.

### NELSHABY WOMEN'S.

Meeting held September 4th. Present: 12 members.

ART NEEDLE WORK.—Miss E. Haines read the following paper:—"Art needle work in a home is one of many things which help to beautify it. There are many different kinds of work classed as 'art needle work,' but I propose to discuss mainly work involving the use of needles, and will endeavor to give a few points on stitchery and coloring. *Material, Threads and Coloring.*—Coloring can make or mar the work. Use good material, as it is a waste of time putting good work on to common material—Semeo traced goods are reliable. Colored work is very nice, and at the present time is popular and fashionable, but in a few years' time it may be out of fashion. For work that is to last, nothing is better than 'white' work. White linen worked with white thread looks rich and good, and is never out of fashion. 'D.M.C. Cotton A' Broder, red label,' is very good for white work. For fine white work 'D.M.C. Perle Cotton, No. 12,' works up wonderfully well, and has a silky appearance when finished. 'D.M.C. Stranded Cotton' is the best colored cotton. It has a soft touch, and when worked has a silky appearance. Stranded cotton is the cheapest, because for fine work one need only use a single strand. For flowers and leaves two strands are best, with one strand for stems. If using more than two for flowers, use two for stems. In making tray cloths, d'oyleys, toilet sets, &c., either a white or colored linen or Indian head may be used. If a colored material, see that colors used blend with it. If colors do not harmonise, all one's work is wasted. For instance, never work a purple flower alongside a red or blue flower. These colors may be used, of course, but see that they have a yellow or autumn tint between them. Also, be careful what shade of



green is used for stems close to a blue flower. Use light green with pale flowers and dark green with dark flowers. When using pale shades, see that all are pale, and *vice versa*. Be careful when purchasing silk threads. A stiff silk is not much good. 'Classic' and 'Mallard Floss' are two good silks. If using 'Classic' on a soft material, such as crepe de chene or georgette, always press the thread before using. For underclothing use a soft, stranded silk. *Working*.—Never tie a knot in the thread, but catch thread to linen at back very neatly. When finishing off run the needle through some of the stitches at the back, pull firm, and cut the thread. When the cloth is finished it should be just as neat at the back as at the front. If keeping work it is advisable to wash and boil. Do not blue or starch it. The starch will rot the linen. Never get the work heavy-looking or 'plastered.' A cloth will look more effective if worked simply. *Stitches*.—'Open work' looks well on white linen. There are three different kinds of open work—Richelieu, Roman cut, and Venetian work. Richelieu is the design cut out—commonly known as 'ladders.' Roman is a design cut out and connected with bars. Venetian is the design cut out but without bars. Some very simple stitches can be introduced into the work, amongst them being lazy daisy, thousand flower, stem stitch, French knots, twisting, chain stitch, Indian filling, and bullion stitch. Lazy daisy can be used for flowers and leaves, thousand flower for flowers and leaves, stem stitch for stems and any outlining, French knots for centres of flowers, twisting and chain stitch for outlining, Indian filling for centres of flowers and filling in, and bullion stitch for flowers. Although lazy daisy is one of the easiest of stitches, it is very often worked wrongly. First, catch the cotton to the back of work, bring needle through at point of petal nearest centre of flower, put needle back in same hole, bring point of needle out at end of petal with thread under needle, pull needle through, pull thread tightly. Always leave a long point at the end of the petal, and work towards the left. (2) Thousand flower is just a straight stitch; catch cotton at back, bring needle through at centre and down at the point of petal, always working towards the right. (3) Stem stitch; catch cotton at back, bring needle through at the point nearest to one's hand and work outwards, take up small bit of material, pull tightly. (4) French knots; catch cotton at back, bring needle through to right side, twist cotton two or more times around needle, put needle back into same hole, pull through and finish off. (5) Twisting; catch cotton with one color, do a running stitch, and with another color twist in and out of running stitch. (6) Chain stitch; catch cotton at back, bring needle through to right side, put needle back into same hole, bring needle through, say at about one-eighth of an inch, thread under point of needle, and pull through, working towards you. For the heavier colored works, such as cushions, curtains, covers, supper cloths, tray cloths, &c., we have more of a variety of stitches to choose from amongst them being satin stitch, double cable, solid Kensington, eyelets, and crewel stitch. For underclothing or babies clothes, herringbone, Craig, feather stitch, feather and rose, snail trail, and oyster stitch are effective variations. Roses can be either fibron or bullion stitch, both look very pretty. Hand hemstitching also makes an effective trimming, and is quite easily done. *Wool Work*.—Rainbow brand wool is the best for any embroidery work. For knitting use Scotch fingering or Baldwins & Patons' wool, two-ply baby wool being the best for babies' clothes. Any wool is suitable for tapestry work. *Knitting*.—First master the 'plain' stitch, then the 'purl,' after which it will be possible to learn fancy stitches. See that the needles used knit the wool easily. If the needles are coarse, a coarse wool is required, or the knitting will be too loose. Size 8 needle is suitable for four-ply wool. For coarse knitting use size 7, while for two-ply wool use size 10. Always cast on firmly, counting the cast on stitches as a 'knit' row. Develop an 'easy' style of knitting. If the stitch is either too tight or too loose, the finished article will not be smooth and even. Finish off the work firmly. One of the easiest articles to knit is a scarf. Babies' clothes and underclothing are also comparatively easy to make. Dresses and jumpers are more difficult, because the work must be shaped as it progresses. When buying wool it is advisable to purchase a little more than is required, because one may not be able to match it, and the knitting will then be wasted. For babies' clothes, pale, delicate shades must be used, but for grown ups bright, gay colors can look very smart. Never use cheap wool, particularly for socks. *Crocheting and Tatting*.—Some years back crocheting and tatting were quite out of date. Now they are very fashionable. Both make effective edges when worked around tray and supper cloths, d'oyleys, handkerchiefs, etc., and on underclothing. Dresses, shawls, babies' wear, slippers, bed socks, and many other articles may be crocheted. However, crocheting is much more expensive than knitting, because it uses more silk or wool. *Tapestry Work* is another expensive work; it requires a considerable quantity of wool, but the work is well warranted. Beautiful designs may be obtained for fire screens, cushions, stools, and furniture. Making floor rugs is another fascinating work, and even though they take a lot of wool are much cheaper than those purchased. *Stencilling*



is a very easy way of painting articles, and can be used on dresses, curtains, cushions, etc. The work can be much improved if some of it is outlined in silver or gold. *Cushions*.—These can be useful as well as ornamental. A useful cushion can be made from a sugar bag. Get a clean sugar bag and unpick sewing, then dip in a dye made from 1 tablespoonful of Condyl's crystals dissolved in 2galls. water. Hang on the line while dripping wet. Whilst still damp, press with hot iron. Make into whatever size cushion required, fray bag at each end to form a fringe, and work design on side with either wool or raffia, using any stitch such as buttonhole, chain, single cable, running stitch, and twisting. Such cushions can be used in the car, kitchen, or in the garden. Arris cloth and poplin also make serviceable cushions, either worked or painted, and can be used for comfort in the house. Satin and silk poplin worked in silks, painted or plusette, and rucked or corded, can be made into elaborate cushions. Such cushions are made to be seen and not used. Curtains look beautiful if worked in silk or plusette. *Bead Work*.—Beaded designs on cushions look extremely smart. Evening bags in beaded designs are expensive to buy, but if one gets a fine canvas, a bead needle, and No. 8 perle cotton, together with various shades of beads, hours of stitching will result in a beautiful evening bag. *Raffia Work* is at present very popular. Designs may be worked on bags, cushions, trays, baskets, and boxes. To make a bunch of cherries from raffia, get a large bead, thread a large needle with red raffia, cover bead all around. For leaves, draw a leaf on stiff canvas, work with buttonhole stitch, then cut out, hang each cherry on a piece of green raffia and form into a bunch. This can be put on the top or side of a box, or in one corner of a cushion. Any flowers can be made in practically the same way." (Secretary, Miss A. Lawrie.)

#### NELSHABY WOMEN'S.

Mrs. Jose presided over an attendance of 12 members at the meeting held on October 2nd, when a report of the Annual Congress was supplied by Mrs. F. Jose and Miss A. G. Lawrie (Secretary).

#### WANDEARAH.

August 12th.—Present: 18 members.

**SHEEP AND WOOL.**—Mr. N. Dennis delivered the following address:—"As most farmers keep a few sheep in conjunction with their farming pursuits, it should be their aim to get as much profit out of them as possible, as well as keeping the fallows clean. For this purpose I advise keeping a good class of Merino ewe with a good, large frame, and strong wool, say of a 60's type, and if purchasing ewes for breeding, always buy ewes from four-tooth to six-tooth and mate them with a crossbred ram. My first choice for this purpose is a Dorset Horn, and secondly, one of the Down breeds. These rams get an early maturing lamb which should be ready for market at about 16-20 weeks of age. I advise mature ewes for this purpose, because the crossbred ram has a tendency to leave a lamb rather coarse in the head and shoulders, so that with young or maiden ewes there is a risk with both ewe and lamb. Mate the ewes about the end of November with one ram to not more than 40 ewes. I advise yarding the ewes during the main lambing period, because foxes are so troublesome that a large number of lambs dropped are taken in the night. Farmers should endeavor not to overstock, try and keep the sheep in good condition all the year round, then one can often catch a good market with dry ewes and replace them with sheep in store condition, and so make a few pounds of ready cash. Shear in the latter part of August or early September to give the sheep a chance to get into good condition on the flush of feed and so have them strong to be able to withstand the dry periods. Sheep that are fat will go through the summer on scant rations if they have plenty of water and a little shade provided for them. It does not pay the small flock owner to class the wool into too many lots. Make one lot of the best fleeces, not skirting too heavy, but see that most of the dirty edges are removed; take the bellies and best pieces and brand as such in one lot, the sweepings from the board and stained pieces should be branded as locks, making in all three lots. Keep the ewes well crutched, this will be a check on the blowfly, as they seem to require a certain amount of moisture to work on. Efficient dipping also helps to minimise the blowfly menace. When breeding for lambs the farmer should try to get rid of all crossbred lambs, either by sale or slaughter for rations; they are bad on fences and tend to make rogues of otherwise quiet sheep. The fact of having a few crossbreds at shearing time also causes extra work with the grading of the clip. Always try to have only a straight line at shearing time. For the man who keeps just a few sheep for ration purposes, I have found it quite satisfactory to have a ram with the flock at all times, so as to have a supply of smaller mutton on hand."

Mr. C. Perry delivered the following address, "The Type of Sheep for the Farm":—"The type of sheep for the farmer must chiefly depend on the locality where they are



depastured. For instance, in the drier districts, where the rainfall does not exceed an average of 10in., it is a mistake to try and keep any breed except the Merino. Experience has proved that the Merino is essentially adapted to this class of country, as it can withstand the hardships common to all these areas. The Merino can live on comparatively little food; the British breeds, on the other hand, require more food and water. After the locality has been decided, what branch of the industry does the farmer wish to pursue is the next question? Does he mean to keep sheep merely for the purpose of keeping his land clean, if he be an agriculturist, or for shearing them? Or does he intend to raise fat lambs for the market, breed sheep and sell fat wethers, or breed sheep and sell his increase as stores to the man who buys for fattening? Referring to the farmer who keeps sheep chiefly to keep his land clean and incidentally to get what profits accrue from depasturing them, the chances are that such a man will buy sheep rather than breed them. In such a case it is advisable to buy from a good flock. By buying sheep simply because they cost little, the chances are that the farmer will never be able to fatten them, and when he has to sell he will probably get little or no profit on his purchase. If he wishes to breed, there is no question about the advisability of having good stock to commence with. *Fat Lambs for Market.*—The first point is to know whether the locality is suitable. The practical man will know that in order to successfully breed fat lambs for market the country must be suitable, and what is also very important, there must be a ready access to a market, because the longer time the lambs are on their way to market the more they deteriorate in value. *Breed of Sheep.*—Here, again, the locality plays an important part, and it is fairly safe to say that where the rainfall is not more than about 20in., it would be found advisable to use a big-framed Merino ewe and one of the early maturing breeds of rams. The Shropshire, Southdowns, and Dorset Horn are all excellent rams for this purpose. In wetter localities, where the rainfall is 25in. or over, it may be advisable to keep half-bred ewes, and in this respect the half-bred Lincoln or Leicester ewe, or in exceptionally wet localities the half-bred Romney Marsh will be found very useful. Under wet conditions they are good doers and proved excellent mothers. The ram used in this instance should be a choice from the early maturing breeds already mentioned. *Raising Fat Wethers.*—This has been found to be profitable in certain districts, but it is only under special conditions that one can recommend such a course. If the land is good, and the farmer adopts this branch of the business, it is essential to have the big-framed sheep. If it is on a Merino country, then the big-framed type of Merino by all means; if, on the other hand, it is crossbred country then the Crossbred Leicester, Lincoln, or, under wet conditions, the Romney Marsh. In advocating the Leicester, Lincoln, or Romney Marsh crossbreds one is influenced by the fact that not only do these sheep produce a big weight of wool, but it is always saleable, whereas the other English types which, although much earlier maturing, do not produce either the same weight or quality of fleece. Finally, as to whether it is advisable to sell rather than fatten, the class of country must be the guide. Here, again, it is advisable to use the bigger framed Merino in Merino country.' (Secretary, Mr. J. O'Shaughnessy.)

## LOWER-NORTH DISTRICT.

### (ADELAIDE TO FARRELL'S FLAT.)

AUBURN WOMEN'S (Average annual rainfall, 24.12in.).

September 26th.—Present: 11 members.

The meeting was held at Miss Dennison's residence. The report of the delegates to the Annual Congress was discussed.

**CAKE FILLINGS AND DECORATIONS.**—Mrs. Wishart read the following paper at the meeting held on October 31st, which was attended by 13 members:—"In cake filling there are a variety of makes and flavors to choose from, and when used with layer cakes most suitable for fillings they are very acceptable at afternoon teas and suppers. Cakes mostly used, and to which a nice filling both improves the taste and appearance, are plain sponge, butter sponge, ribbon cake, cinnamon sponge, and ginger sponge. Care must be taken to have cakes cool before commencing the fillings or decorations. Should there be a number of cakes needing fillings, make sure all the required ingredients are on hand before beginning. Icing sugar should be crushed and put through a sieve before using to get best results. When using a flavoring in a cake use the same in the filling. When using whipped cream as a filling, the cake must be used while the cream is still sweet. A plain sponge is most suited for a vanilla flavored whipped cream. Butter sponges need a filling flavored with the juice of a lemon or orange. A butter filling can be used to advantage in ribbon cake, layer cake, and ginger sponge. In decorating a cake, say for a birthday, trim off the top to make the cake level,



then turn underside upwards, to give a nice smooth surface on which to work, and place the cake on a flat plate. Icing should be made with the beaten white of an egg to a stiff froth, adding enough icing sugar to make a stiff paste. Cover the cake with one layer and allow this to set. Give another covering, adding the decorations at the same time. Cakes can also be made to look attractive at little expense by using colored icing in contrast with white icing. *Lemon Tart*.—Ingredients: 1 cup S.R. flour, 1 egg, 1 tablespoon butter, a little sugar, pinch of salt, and mix with milk. Filling: 1 tablespoon cornflour, 1 cup of sugar, yolk of an egg, grated rind of 1 lemon and the juice, 1 cup of water. Method: Put into a saucepan and boil, stirring all the time. Fill tart with mixture. Beat white of an egg to stiff froth, add a little sugar, and spread on top of cake. If preferred, date filling can be used— $\frac{1}{2}$  lb. dates, 1 apple, 1 teaspoon ground ginger, and stew ingredients in a little water. *Apple Cake*.—Ingredients:  $\frac{1}{2}$  lb. butter,  $\frac{1}{2}$  lb. sugar, 4 eggs, 1 cup milk,  $1\frac{1}{2}$  lbs. S.R. flour. Method: Melt butter and sugar together, beat well, add egg one at a time, then add milk, and lastly flour. For the top of the cake  $\frac{1}{2}$  lb. plain flour, 2 ozs. sugar, and 1 teaspoon cinnamon are required. Mix these together, and peel, core, and slice 6 apples. Melt  $\frac{1}{2}$  lb. butter and mix dry ingredients with melted butter until lumpy. Spread a little melted butter over the cake mixture, then apples, then the dry mixture, and bake." (Secretary, Miss L. Dennison.)

#### AUBURN WOMEN'S (Average annual rainfall, 24.12 in.).

November 27th.—Present: 10 members and two visitors.

**JAM MAKING.**—Mrs. J. Schmerl read the following paper:—"Select fruit that is firm and sound, fruit that is over-ripe will not set nicely and is more likely to candy, ferment, or develop mould, because there is too much sugar and not enough jelly in it. For boiling jam I prefer a shallow enamelled pan, because it allows free evaporation. On no account have a lid on the utensil in which the jam is to be boiled. Insufficient cooking is often the cause of failures. The jam will not set, and over cooked jam loses not only the color, but destroys the jelly that every fruit contains. Sugar acts as a preservative, and brewers' crystals are generally better to use. I have used it for one whole season's jam making, but cannot say that I have found the difference very noticeable. Manufacturers claim that one needs less sugar by using brewers' crystals than the fine sugar, but I think the difference is about equal, because crystal sugar is always several shillings dearer than the A1 fine. My experience has shown that by adding in most cases 1 lb. of sugar to 1 lb. of fruit one will achieve the most success. I select firm fruit, cut it up (cut plums in halves), put into pan with about 1 lb. sugar and just a little water, and boil until tender. Apricots take only a little while, plums, &c., longer. Then add the sugar and boil quickly for about half to three-quarters of an hour. Always boil jam quickly. *Sweet Marmalade*.—4 lbs. oranges, 5 lemons, 12 lbs. sugar, 16 cups water. Cut oranges and lemons and stand over night in the water, boil fast for half an hour, then put in sugar and boil until it jellies (about one hour); it is generally then quite thin, but will jelly after about three days. *Gooseberry Jam*.—To every pound of gooseberries add 1 pint of water, and boil until tender. Add  $1\frac{1}{2}$  lbs. sugar and boil about half an hour, or until the fruit turns to a pretty pink color." (Secretary, Miss L. Dennison.)

#### BLACK SPRINGS.

August 5th.

Meeting held August 5th. Present: 12 members. The meeting took the form of a Question Box, when several subjects of local and timely interest were introduced, and an interesting discussion ensued. (Secretary, Mr. K. Dunn.)

#### BLACK SPRINGS.

September 2nd.—Present: 11 members.

**COST OF WHEAT PRODUCTION.**—Mr. A. Mickel read the following paper:—"During the years that have passed since the production of wheat has become general, much has been done to obtain maximum yields. Agriculture has reached a stage when one is at a loss to know in what direction to turn to increase production. There is one factor, however, that is the controlling influence in success, and that is rainfall. All avenues of cultivation and most productive varieties of wheat and scientific methods have not, and never will, overcome the vagaries of the seasons. Without rain in sufficient quantity and at the right time of the year, the farmer's efforts are futile, as has been the case in many parts of the State the last few years. Not only has the farmer's labor been in vain, but seed, super, fodder, or oil and tractor fuel have been wasted, and his efforts have failed. The farmer has so much at stake that he has no option but to stick to it whether good seasons or bad ones prevail. Decreased cost of production is the only avenue of relief that presents itself to the farmer at the present time, and



this is ruled by many governing factors, primarily by the fact that the farmer is not able to pass on to someone else the cost of production, and has to take what is given to him for his produce; but there is room for improvement in his conditions, and to bring about such there should be created a governing body to protect his interests. The manufacturers have their Chamber of Manufactures, and the commercial men have their Chamber of Commerce, but the farmer has no means of redress for his grievances."

On August 4th an inter-Branch visit was paid to the Hanson Branch, and the subject, "Is land too expensive in this District?" was debated. The speakers from the Black Springs Branch were judged the winners of the debate. (Secretary, Mr. K. Dunn.)

#### BRINKWORTH (Average annual rainfall, 16.01in.).

Mr. E. Carlyon occupied the chair at the meeting held on August 4th, which was attended by 23 members and several visitors. Addresses were delivered by Messrs. W. Brownrigg and W. C. Johnston, of the Department of Agriculture. Mr. H. Ottens read a paper, "The Cost of Producing Wheat." (Secretary, Mr. H. Ottens.)

#### BROWNLOW.

August 6th.—Present: 18 members and four visitors.

**SHEEP ON THE FARM.**—Mr. F. Roocke presented the following paper:—"In selecting a flock of sheep for the farm it is essential that one choose the type of sheep most suitable to the district. For this district, the large-framed fairly plain-bodied Merino is best; they do better than other sheep in very dry seasons. See that the sheep are not too loose and open in the wool, otherwise sand and dust will then enter the wool too easily. Breeding ewes should not be too woolly about the face, or the offspring will generally be wool-blind, unless they receive close attention. A sheep that can see where it is going is bound to do best, especially when feed is scarce. The wool should be as even as possible throughout the flock. To arrive at that it is necessary to cull every year, keeping the ewes with a good even-quality wool, good constitution, and large frame. If possible, dispose of all the old, poor woolled, small, and unthrifty ones. By keeping young sheep one gets a better return per sheep than by keeping old ones. It is most profitable to sell all wether lambs and ewe lambs which are not wanted for breeding when they are five or six months old. Even when in only fair condition they usually bring a good price. A lamb at that age will fetch as good a price as a full-grown sheep. Sheep are very useful on the farm for keeping down weeds on the fallow, and for cleaning up the last of the stubble after the larger stock have finished with it. A few sheep should be kept on every farm, if only to supply the household with meat. Sheep must be watched closely to see if any are flyblown. 'Prevention is better than cure,' so it is better to crutch the sheep fairly often than to be continually treating flyblown sheep. They should be kept in a healthy condition; poor sheep are generally the first ones struck by the fly. All ram lambs should be docked as young as practicable, preferably when two or three weeks old, as they recover much quicker than when they are older. To perform this operation one should have a knife with the back part of the blade blunt. The end of the purse should be cut right off and the testicles taken between the thumb and the blunt part of the blade and drawn out gently. An antiseptic should be applied, to prevent germs getting into the wound and sometimes causing lockjaw. The tail should be cut fairly short, especially that of ewe lambs. Care should be taken not to drive sheep too far immediately after lambs have been tailed. In summer see that the sheep have plenty of water. They will do fairly well even if

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there is not very much feed about, providing they have plenty of good water and not too far to go to it. Any bad fencers should be disposed of as soon as possible, because they will soon get the flock into the bad habit of getting through fences. Wool is damaged and lost in this way. When there is plenty of dry grass left in the summer it is best to mate ewes in December and January, or perhaps a little earlier, to have the lambs dropped before the cold weather sets in. Rams should never be left with the ewes all the year; this causes an irregular drop of the lambs, and there will never be as good a percentage of lambs as when they are only joined for a short time, say two months. If only one ram is kept, it should be put with some wethers in a separate paddock or kept in a small enclosure and hand-fed. If the ram runs with the flock all the time he should wear an apron, although keeping the ram away from the ewes except at the mating time is best. Lambs should never go through the summer with the wool on their backs. The fleece at the second shearing is better when they are shorn as lambs, and they do not gather so many grass seeds. Shearing before summer will ensure better conditions, and will lessen blowfly trouble. Young ewes should never be mated to any of the mutton breed rams or there will be a great loss at lambing unless assistance is given to the ewe. Now that wool is low in price it would be quite a payable proposition to breed crossbred lambs, providing the farmer has plenty of feed. They mature earlier than the Merino and fetch a better price on that account." In answer to questions, Mr. R. Smith, a member of a neighboring Branch, recommended the tailing of lambs before they were six weeks old. For owners of 100 or smaller lots it paid to have wool classed in the city, providing the dusty back was first removed. He also recommended keeping all ewe lambs for improving the flock, and agreed with Mr. Rooke that the Merino was the best sheep for the district, as they were more active than other sheep. (Secretary, Mr. T. Partridge.)

#### BROWNLOW.

September 3rd.—Present: 16 members and three visitors.

The meeting took the form of a "Question Box," the following subjects were discussed:—What is the best way to prevent soil from drifting? *Answer*—Leave belts of timber across the path of the prevailing wind, work soil when wet, and leave unharrowed. What is the best remedy for a horse that injures its shoulder? *Answer*—Apply Schmidt's liniment and bathe with warm water alternately, using one to-day and the other to-morrow. What is the best way to remove rivets without injuring the leather? *Answer*—Place the rivet over a hole in iron and knock out with a punch. Does lucerne need much water? *Answer*—Yes. Cut often and water freely.

CLARE (Average annual rainfall, 24.67in.).

August 5th.—Present: 18 members.

MANURING FRUIT TREES AND VINES.—Mr. A. Ninnes (Secretary) gave the following address:—"*Method in which Plants in general obtain their Food.*—There are two main sources, namely, the air and the soil. The plant absorbs carbon dioxide or carbonic acid gas from the air through its leaves and gives out oxygen, while from the soil it takes in its water supply with small quantities of dissolved mineral salts. The supply of carbon dioxide is out of our control, and so is the water supply to a large extent in this district. We can only cause a greater amount to be available to the plant by more efficient cultivation. It is to the mineral salts that we must now turn our attention. Elements necessary to build up a plant are carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, potassium, magnesium, calcium, iron, and silicon and sodium to a lesser extent. Of these only carbon comes from the air, while the others are absorbed as salts dissolved in water. These salts in the soil must be rendered soluble in water if insoluble, as it is of no use applying manures which do not contain the plant food in a soluble form. However, the insoluble plant foods may be made soluble by the application of substances classed as soil amendments, such as gypsum and lime. These substances are very often applied to make the potash in the soil soluble. In dealing with the question of manuring, we turn mainly to the three elements—nitrogen, phosphorus, and potassium. So far as wheat-growing is concerned, the phosphate compounds are usually the most deficient. Nitrogenous compounds are also lacking, but by careful cultivation, bacteria in the soil are able to collect enough nitrogen from the air to supply the wants of the cereal crops. Except in the case of poor, sandy soil, we find enough potash compounds, although in some cases they are in an unavailable form. *Nitrogenous Phosphatic and Potassic Fertilisers.*—Each have a specific action on all plants. Nitrogen promotes vigor, gives largely to development of shoots and leaves with a dark, green color. Thus, weakened vines should receive large dressings of nitrogen, whilst very vigorous vines and unproductive ones require little or no nitrogen. An excess or too much nitrogen gives grapes rich in nitrogenous compounds, fairly soft and susceptible to



disease, and of low-keeping qualities. Wine from these grapes take a long time to become bright and is especially subject to bacterial diseases. Vines are more subject to all kinds of bacterial diseases, and grapes cannot ripen owing to the shortage of water in the soil, which is caused by excessive transpiration of soil moisture through the large amount of foliage. The wood is also retarded in ripening. However, organic nitrogen, as applied in green manuring or farm yard manure, increases the water-holding capacity by the addition of that all-important substance, humus, and therefore is not so injurious as excess mineral nitrogen. The addition of phosphates to a large extent neutralises the evil effects of excess nitrogen. With the phosphates, production increases and the berries set much better; it also gives a better ripening of the grapes and wood, which takes place sooner and more completely. The phosphatic content of the grape is increased, which greatly favors fermentation in wine, and also its quality, thus accounting for the heavy dressings of phosphates in the French districts that produce the high quality wines. Root development is considerably increased, this being particularly valuable in clay and ripening is hastened. If grapes are harvested early or complete ripeness is not reached, crops that have received dressings of phosphates will be richest in sugar, because phosphates hasten ripening. Thus, the sugar content of the grapes is raised in cold districts, not directly but indirectly through earlier and therefore better ripening. Lack of potash is evident from the poor, dull color of leaves and loss of rigidity in shoots. Such plants are much less resistant to diseases and pests, than plants with normal potash requirements. It helps to neutralise the acid in the juice of grapes and so prevents the must being too acid; it usually contains more free acid in a dry summer. Potash plays a very important part in the formation, translocation, and deposition of sugars and starches which are found chiefly in the fruits. Thus potash is a very important factor in the production of the fruit of both vines and fruit trees. *The Materials Removed by the Vine.*—Mr. F. de Castella gives the following figures for an average crop of 5 tons of grapes per acre:—Nitrogen, 33lbs.; phosphorus, 9lbs.; potash, 27lbs. The famous German research worker, Wagner, found that there were only very slight variations with different varieties of grapes, and Muntz gives the following figures for the amount of each element absorbed by the different parts:—

| Parts of Vine.   | Nitro.<br>Per cent. | Phos.<br>Per cent. | Pot.<br>Per cent. |
|------------------|---------------------|--------------------|-------------------|
| Leaves . . . . . | 66                  | 50                 | 50                |
| Canes . . . . .  | 16                  | 20                 | 25                |
| Grapes . . . . . | 25                  | 33                 | 33                |
| Wine . . . . .   | 3.4                 | 10.4               | 13.9              |

From the above figures it will be seen that wine only removes a small portion of the mineral food taken up by the vine, therefore, if the canes and leaves in the vineyard are kept, and the marc (seeds and skins) is returned, there is very little plant food to be supplied. Under practical conditions only about one-third of the leaves is returned to the soil, and usually only the ashes from the canes, which, although very important, is not the complete mineral content because the nitrogen is lost in burning, and in a goodly number of instances growers do not return the seeds and skins or their equivalents. To make up this shortage, we must supply the soil with fertilisers in some form or other, although it may not seem necessary, because the vine reaches to a much greater depth than the average cereal crop, but it is found that after a number of years, except where very rich soils exist, the vines have a tendency to reduce their crops. This is due mainly to the fact that the food supply is becoming deficient. Perold, in discussing this question, recommends that the composition and nature of the soil, as well as the climate, should be taken into consideration. Thus it is difficult to give a strict formula. He recommends that the following amounts should be applied to a vine in some form or other:—30-40lbs. nitrogen, 40-60lbs. phosphorus, 40-50lbs. potash. These quantities are found in:—150-200lbs. ammonia sulphate, 160-240lbs. superphosphate, 112lbs. sulphate of potash. However, it would not be recommended to apply the above quantities of expensive fertilisers, but we must consider the ways in which the equivalents may be applied. As we have no experimental data, I quote the manurial dressings applied in this district:—1½cwt. ammonia sulphate, 2½cwt. superphosphate. Another is:—1cwt. ammonia sulphate, 2cwt. superphosphate, 1cwt. sulphate of potash. *Method of Applying the Food Material.*—All three can best be applied in the form of a well-rotted farmyard manure. In 4½ tons per acre we would thus be giving 36-54lbs. nitrogen, 18-27lbs. phosphorus, and 45-63lbs. potash. This quantity would be sufficient except as regards phosphates. Farmyard manure also supplies organic or vegetable matter which turns into humus. Humus increases the water-holding capacity as well as the physical condition, by making it more pliable. In most gardens there is not sufficient stable



manure each year to do the whole vineyard. If there is enough to fertilise, say a quarter annually at the rate of 4½ tons per acre, divide the vineyard or orchard into four sections, thus giving the area a dressing once in four years. The other years give artificial fertilisers. Where it is possible to fertilise with farmyard manure annually, it is recommended to add approximately ½wt. super. Another very important method of fertilising as well as increasing the organic material is by green manuring. Instantly difficulties arise, but I think with judicious work many can be overcome. I refer to the benefits obtained during 1914 by Mr. C. T. Jarman. In his paper on March 15 he stated that the ground was very hard and difficult to plough, the peas were only partially covered. Part of the vineyard was not green manured; it ploughed nicely, and everything pointed to the green manuring being a failure; but the results were overwhelmingly in favor of green manuring, because they were the only vines to carry grapes right through the season. The points to be considered under green manuring are whether the crop used will supply bulk enough and whether it will be far enough advanced to be ploughed under and rolled before the dry weather sets in. The type of crop most suitable is obviously one from the legume family—*e.g.*, peas, beans, lupins, etc. These are most suitable because of the presence of bacteria in the root nodules which flourish on the nitrogen from the air, converting it into valuable plant food instead of in the case of barley and other plants which use the nitrogen already in the soil. The time to plough under is very important. This is done when the peas are in full flower and hence at the top of their development. It should be done before winter rains are over and when there is still sufficient moisture in the soil to enable the green material to change into humus. If this operation is delayed until the soil is too dry, ploughing is difficult, and the green material will largely undergo dry rot instead of becoming humus. To plough under, roll, harrow or tramp the crop in order to bury it properly, it is advisable to use a disc coulter and chain on the plough. Green manuring, however, is not so suitable where rapid growth of the green crop is prevented, and this brings us to the consideration of the rapid growth made by barley, which is not as good as peas, but a good substitute. *Wine Marc*.—I am afraid this method of returning part of the material to the soil is far from properly used in this district. From the figures previously quoted it will be seen that the residue contains a high percentage of nitrogen and should be returned whenever possible to procure. It is recommended that this substance should be mixed with a little lime or gypsum. It contains twice as much nitrogen and about the same amount of phosphate and potash. Too much stress cannot be laid on this method of manuring, and I would advise members strongly to secure as much of the skins, stalks and seeds as possible from the winery. *Most Suitable Form in which to Apply Artificial Fertilisers*.—Here again I refer to Chauzit, a French investigator. He gives the order of preference for the application of nitrogenous manures as follows:—1. Dried blood and nitrate of soda—mixture. 2. Wine marc and nitrate of soda—mixture. 3. Dried blood. 4. Nitrate of soda. 5. Wine marc and ammonium sulphate. 6. Ammonium sulphate. 7. Cyanamide. For economic reasons I should say apply wine marc and ammonium sulphate. Phosphates are best applied in the form of super or basic slag, or finely crushed rock phosphates. *Potash*.—Chauzit gives the following order of preference for potash manures:—Carbonate of potash—in ashes. Nitrate of potash—ordinary saltpetre. Sulphate of potash. Muriate—chloride of potash. Sylvinit—crude salt from Stassfurt. Under these conditions, the carbonate is the best potassic manure, but for economic reasons the sulphate should be preferred. *Lime*.—Most soils contain enough lime to provide the vine's food requirements, but as green manure crops bring more acid into the soil, it is recommended to add ground limestone or ordinary marl. In this form the lime is not washed out of the soil so readily as slaked or quicklime, nor does it destroy the humus in the soil so quickly. Perold recommends a dressing of three-quarters of a ton per acre of limestone every fourth year. *Time to Manure*.—For farm yard manure, the old Italian proverb holds good—"Better a shovel of dung at Christmas than a cartload at Carnival"—thus showing that its effect is not immediate and should be applied during the early winter. Mr. Castella suggests that the crop of one season has been largely built up from the manure applied 18 months previously. The vine absorbs almost the whole of its phosphate and nitrogen in the big rush of growth before the blossoming in October. Later on this is distributed as required. Potash absorption continues later; nevertheless, the whole year's manurial application should be made before the vine starts its growth. From this it is best to manure during winter, at the time of ploughing, or before. *Manuring Fruit Trees*.—Manuring fruit trees is not an old practice; it has not so far received a great deal of attention, and exact records are very difficult to obtain. Experiments have been carried out at Blackwood, but the results have not been published. However, the tree should give the observing grower hints as to its needs, and if the



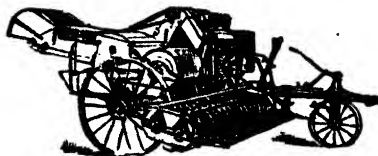
growth of wood and color of foliage are such as to obviously indicate health and vigor, it may safely be taken for granted that all the tree needs is good management, good cultivation, and judicious pruning; but when a tree has received good attention in this respect and still fails to mature a crop of well-developed fruits and make a satisfactory wood growth, and usually at the same time shows signs of distress in the color of its foliage, it needs help; but the grower must first make sure that the trouble is due to insufficient food supply and not to some other cause such as lack of moisture, or too much of it, fungus, diseases, &c. With trees an element of uncertainty comes in, in the different depths to which various tree roots descend. It has been noticed that different kinds of trees of the same kind vary in the depth to which they behave in this matter, and this has some considerable bearing on the question of food supplies available. A tree which draws a large portion of its food supplies from the subsoil is to some extent insensible to the richness or otherwise of the surface soil, and will respond less readily to any application of manures applied there, and it has been stated by Professor Pickering that the chief factor governing the level at which roots flourish appeared to be more dependent on aeration of the soil than on the food supply in it. At the Blackwood Orchard no particular treatment has given consistently the best results, though it is very evident that all tests receiving nitrogen show to advantage over those not receiving nitrogen. From some figures made up it shows that trees receiving nitrogen are yielding more bushels per acre than those receiving any other dressing. In a season like last, with a shortage of rain, the manured trees did not develop their fruits early as well as those receiving nitrogen. Super alone does not give any results, and the same may be said of potash, but super and sulphate of ammonia together have given best results. Trees receiving nitrogenous manures alone have also carried better crops on the whole in the light season than trees not so treated. It is the experience of most growers of fruit trees and vines that trees assisted in the dry seasons produce better quality fruit than those unmanured. In the growing of wheat we find that the difference between manured and unmanured is a far greater percentage than in the best seasons. Mr. J. M. Ward, Superintendent of Horticulture, recommends the following dressings:—Plums



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#### EUDUNDA (Average annual rainfall, 17.19in.).

Meeting held September 1st. Present: 11 members. The annual report was presented by the Secretary, Mr. L. Duldig, and a programme of meetings arranged for the year ending June, 1931.

#### HOYLETON (Average annual rainfall, 17.56in.).

The annual meeting was held on August 25th, there being present Mr. C. Sandow (Chair) and 17 members. The report of the year's work was presented by the Secretary (Mr. W. Chapman) and officers elected for the ensuing year.

#### OWEN.

August 29th.—Present: Nine members.

POULTRY.—In the course of a short paper on this subject Mr. F. W. Rogers stated—"In breeding fowls for market, home consumption, or egg production, it is necessary to provide comfortable quarters for the birds. The size and shape of the house can be arranged according to local conditions, but one point is very important, it must be rainproof and free from draughts. For this purpose galvanized iron, with clean timber on cement concrete walls with an iron roof, is recommended if the house is built reasonably high. Iron is a rapid conductor of heat and cold, but if the house is not less than, say, 7ft. high in front with 1ft. fall to the back the birds will be comfortable. The house should be open to the north or north-east, in order to admit as much sunlight as possible. Another important point of the poultry home is the floor, which should be raised 10in. to 12in. above the ground outside, and if it is to be a permanent fixture, cement or asphalt will make a good floor if laid down reasonably. It will be neat and easily cleaned. If the house floor is not kept dry and sweet the whole atmosphere becomes impure. I prefer swinging roosts made with timber that can be formed into a square and hung by light chains from the corner to the sides of the house. This can be rapidly unhooked when cleaning up the floor, and vermin cannot readily travel over the chains. The mongrel or barndoor type of fowl is not worthy of consideration, the pure-bred bird giving more pleasure to the owner and more profits in the egg box. If poultry are to be kept profitably they require good housing and good, wholesome pure food; on no account should mouldy or unsound grain be fed; animal and green foods are necessary adjuncts, although the bulk of the food should be grain, either whole or ground. Regarding breeding, it is a waste of time and expense in trying to breed from other than good, healthy, and sound stock. By selecting a strong, vigorous cockerel (not less than 10 months old) and mating with about six two-year-old hens of good type, hatches of sound, strong, healthy chickens should result. For egg production any of the Mediterranean breeds are good, for instance, White or Brown Leghorns, Minorcas, Andalusian, or Hamburg are among the best; my preference being White Leghorn or Minorca. One cannot go far wrong if the Black Orpington is selected, because, unlike the lighter breeds, they do not worry stables, haystacks, &c. If a certain cock bird has produced a good line of pullets that have matured early and given eggs of good average size and shape, select a few of the best pullets that are the most prolific layers and mate them back with the old bird, and in all probability one will get better layers from the second year's mating than with the first. To maintain a high standard in the flock vigorous culling and breeding only from the best birds are essential." During the discussion Mr. Bowyer thought cement floors too cold during winter, whilst in reply to questions regarding crossing Mr. Rogers advised crossing back but once, and favored two-year-old pullets. Mr. Bowen thought it a wise plan to use angle iron in place of timber, small fires could then be lit inside the fowl houses and all vermin would be destroyed or driven out. Mr. Lake stated that old tractor or car lubrication oil, if used freely, would eradicate and destroy tick and other vermin. He favored using the oil as a paint—all woodwork, especially joints, to receive a liberal application. Mr. Helps did not favor the pure-bred fowls, as a rule they were too delicate, and the half-bred would withstand more hardship. Mr. McPharlin agreed that the pure breeds were much more delicate, but believed they warranted the extra care. (Secretary, Mr. A. Bowyer.)



**RIVERTON** (Average annual rainfall, 20.86in.).

The Chief Dairy Instructor (Mr. H. B. Barlow) addressed the meeting held on September 8th on the subject, "The Dairy Act." There were present 10 members and six visitors. (Secretary, Mr. O. Longbottom.)

**SADDLEWORTH WOMEN'S** (Average annual rainfall, 19.65in.).

The annual meeting was held on August 19th, there being present 14 members. The annual report was read, officers elected, and a programme of meetings arranged for the ensuing six months. Members reported having visited the Auburn Women's Branch on the occasion of Miss Campbell's lecture. (Secretary, Miss D. Partridge.)

**SADDLEWORTH WOMEN'S** (Average annual rainfall, 19.65in.).

September 9th.—Present: 10 members and two visitors.

**FANCY WORK HINTS.**—The meeting was held at the residence of Mrs. J. Frost. The following paper was presented by Miss E. Frost:—"Colored Embroidery.—Colored embroidery is very effective, and some pretty designs can be obtained either on white linen, colored crash, or colored linen. Small designs look very nice worked with one strand of stranded cotton; larger designs with two, three, or four strands cotton A'Broder, or pearl cotton. White embroidery, crochet, tatting, also the old fashioned hardanger canvas, punch work, Mount Mellick work, are all serviceable and launder beautifully. When the Victorian Better Farming Train was at Riverton last year there was a lecture on dressmaking and fancy work. One thing that attracted attention was the sugar bag cushions. The sugar bags are dyed with permanganate of potash, and then worked with fancy stitches in colored wool, either embroidery stitches or cross stitch. *Crochet*.—Crochet should be done evenly. It loses half its beauty in appearance when finished if some trebles are longer than others, or some chains or doubles are done loosely. Another important point is to always use a needle to correspond with the thread, a small needle for fine thread and a larger needle for coarser thread. Use a No. 7 crochet hook for fine cotton for working d'oyleys and handkerchief edgings, and a No. 4 or 5 hook for coarser crochet cotton, fibron or any other thread of about that size. For d'oyleys 80 Mercer crochet cotton may be used, or preferably, perhaps, 100. Sandwich d'oyleys are effectively crocheted in 150 Mercer cotton, and also handkerchief edgings. Crochet should always be ironed on the wrong side when laundered, and pulled into shape before being pressed. *Tatting*.—The thread used in tatting is very important in the appearance of well-finished work. It must be firmly twisted, smooth, and even. Colored tatting is charming when it harmonises with colored work. Tatting is easily soiled when working; the work is held firmly with the fingers, so always be careful to have clean hands when starting. Care should be taken in joining. Always join cotton at the finish of a ring, and be careful not to tie a "granny's" knot. The ends must be cut off close to the knot. When working with two threads, the ball and the shuttle, it is best to have another ball of the same thread to refill the shuttle, to avoid breaking the thread on the ball. Tatting, like crochet, must be done evenly to ensure a well-finished appearance. All rings must be pulled tight. In the "Semco Tatting Book" it advises the use of borax in the water when washing. Do not wring with the hands, but squeeze out the soapy water and rinse in two waters. Tatting should be ironed when nearly dry, pulled into shape with fingers, and placed on a well-padded ironing board, covered with a thin cloth, and pressed carefully. Never rub an iron over unprotected tatting. Mercer crochet cotton is suitable thread for this work, and it can be

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purchased in a number of sizes. *Knitting*.—Knitting also must be done evenly. For fine wool use small needles and larger needles for coarser wool. "Hug-me-tights" are knitted usually on very large needles. All knitting should be pressed lightly on the wrong side, under a damp cloth, when finished. Always see that the pattern is level when making a seam in fancy knitting. To make a firm edge when casting on stitches use two threads. For socks, do not cast on tightly—allow room to stretch. Always graft the stitches together for the toe of a sock. Grafting can be done to look like continuous knitting. *Richelieu and Eyelet Work*.—In richelieu work all bars across where the linen is cut away should be worked first, and fastened into the linen on each side. This is to prevent breaking away, and the button-holing can be done much more evenly. Be sure to catch up the bar when button-holing. In eyelet embroidery it is advisable to cut one or two threads each way. This prevents the linen from "puckering" around the eyelets. Put the stiletto in the eyelet, cut the thread with sharp scissors, and then insert the stiletto lightly once again. (Secretary, Miss E. Frost.)

Meeting held October 7th. Present: eight members. The reports of the delegates to the Annual Congress was received and discussed.

#### WASLEYS WOMEN'S.

August.—Present: 43 members.

*Hot Box Cooking*.—Mrs. C. George read the following paper:—"The hot box can be made at home with a box with a firm fitting lid, which, for convenience, will go under the kitchen table. Pack the box firmly with chaff, and bring the stew, cutlets, porridge, &c., to the boiling point on the stove. Then well wrap the utensil in an old blanket and push it down firmly in the middle of the box of chaff. Cover the lid of utensil with chaff and close the lid of the box firmly. The ingredients in the box will continue cooking and be ready to serve in five to six hours. Porridge can be left over night in the hot box to cook. Miss G. George read a paper, "Fancy Work," and exhibited some finished articles for inspection.

At the September meeting the annual report was presented, and officers elected for the ensuing year, after which a musical programme was given.

The October meeting was attended by 38 members. Reports of the Annual Congress were received, and the meeting then took the form of a Question Box. Members of the Women's Branch also held a combined social meeting with the Men's Branch to conclude a year of successful work. (Secretary, Mrs. M. Wilson.)

#### WILLIAMSTOWN WOMEN'S (Average annual rainfall, 27.84in.).

Meeting held September 3rd. Present: Mrs. Hammatt (Chair) and nine members. Mr. Hammatt gave a rose pruning demonstration and replied to numerous questions. (Secretary, Mrs. G. Cundy.)

### YORKE PENINSULA DISTRICT.

(TO BUTE.)

#### PASKEVILLE (Average annual rainfall, 15.67in.).

September 2nd.—Present: 16 members.

*THE ADVANTAGES OF MEMBERSHIP WITH THE AGRICULTURAL BUREAU*.—Mr. J. Pontifex, in reading a paper on this subject, said, as a life member of the Bureau, he could state that there were many benefits to be derived from an active association with a Branch of the Agricultural Bureau. Mr. Pontifex gave an interesting outline of the early history of the organisation. Continuing, he said that widespread adoption of the practice of bare fallowing could be traced to the dissemination of knowledge through the Bureau. He also made reference to the value of the *Journal of Agriculture* and the advice that could be obtained through its columns. The Agricultural Bureau Field Trial Societies, particularly the Northern Yorke Peninsula Society, had done an immense amount of good in the interests of the man on the land. Too much credit, said Mr. Pontifex, could not be given to the founder of the organisation, the late Mr. Molinoux, who evidently foresaw the day when a Department of Agriculture would be established and the value that a system of getting in touch with primary producers, such as the Agricultural Bureau, would be to the State and the producers. The Bureau was an ideal channel through which the department could spread its information. Again the Bureau had proved of incalculable value to the various instructors. It afforded them the opportunity of meeting farmers and other landholders and discussing with them the problems that the man on the land was called upon to face. Despite the immense good done by the foregoing, Mr. Pontifex expressed the opinion that the best work of the Bureau was undoubtedly the mutual help which farmers gave one another through being members of the institution, and that alone should induce all producers to become members. The papers read at different meetings were published and so



brought under the notice of Bureau members all over the State. Country Conferences further enhanced the value of the Bureau and widened the views of its members as well as of the officers of the department who attended. In many ways, too, the Bureau sought to safeguard the interests of producers, and was the connecting link between members and the Government. As a means of propaganda for the latest advances in all matters pertaining to agriculture as a whole, the Bureau was a most important factor. In any form of educational work there could be little success without organisation, and the Bureau supplied that very necessary feature. The greater the membership the more efficient would the institution become and the greater would be the opportunities for farmers to gain first hand knowledge on matters in which they were so vitally interested. (Secretary, Mr. J. Prouse.)

#### SOUTH KILKERRAN.

September 2nd.—Present: Nine members and visitors.

IMPROVING THE FARM FLOCK.—Mr. R. Hastings read the following paper:—"It is an accepted principle in sheep breeding that improvement begins when the flockowner decides to use pure bred rams of the breed found to be most suitable for his district. If all owners of small flocks followed this rule instead of using rams, the breed of which they know little or nothing about, they would soon have sheep showing similar type, quality, and grade of wool. Well bred sheep eat no more, and often less, than nondescripts, and on that score alone they must be more profitable. To get the best results the ewes must be carefully culled, and there is no better time to do this work than at shearing time, or just before. Then the animals that are bad doers, carry faulty fleeces, are weak in constitution can easily be detected and a cull mark put on them. Particular care should be taken to see that the ewes have sound, good udders and perfect teats. In shearing, many lambs have their teats injured and later cannot suckle a lamb properly. The cull ewes should be fattened and sold for slaughter. By regular culling and disposing of all the objectionable ewes, and keeping all the best ewe lambs instead of selling them, the flock will steadily improve on the soundest lines. To get the best results from such ewes, the rams should always be typical of the favored breed. In buying rams it is advisable to purchase direct from the breeder 'in the wool.' This in itself is a guarantee regarding their breeding and the class of stock they are likely to throw. Buyers of shorn rams at country sales often pay higher prices than they would have paid for better sheep in the wool direct from the breeder earlier in the season. Wool, shape, and constitution are the three necessary points the buyers of rams have to consider, and those who neglect to buy early cannot expect to get rams of the best type, seeing that the pick are always sold first. Every breed has its special qualities, and each does well when kept under conditions suitable for its proper developments." (Secretary, Mr. N. Schrapel.)

#### THEINGTON.

The monthly meeting of the Branch was held on September 9th, and was attended by 19 members and visitors, including Mr. W. Johnston (District Agricultural Instructor). Papers on the subject, "Horses v. Tractor," were contributed by Messrs. C. Rodda and E. Yelland. A keen discussion followed. (Secretary, Mr. S. Chynoweth, Kadina.)

#### UPPER WAKEFIELD.

The inaugural meeting of the Branch was held on September 4th, there being present 25 members. Officers were elected and a constitution for the working of the Branch was agreed upon. (Secretary, Mr. J. Hartnett, Upper Wakefield, *via* Halbury.)

### WESTERN DISTRICT.

#### CALCA.

August 6th.—Present: Nine members.

The meeting discussed the advantages of fallow competitions. Some members were of the opinion that this district was unsuitable for fallow competitions, owing to the changeable soil; but after the conditions of judging had been explained, it was resolved that a competition be held. (Secretary, Mr. J. Cash, Mortana.)

#### CARALUE.

Meeting held August 6th. Present: 12 members. Several subjects of local and timely interest were brought forward, and profitable discussion ensued. (Secretary, Mr. E. Marshall.)



CLEVE (Average annual rainfall, 14.63in.).

September 4th.—Present: Nine members.

PLANTING A FRUIT GARDEN AND VINEYARD.—The first point that should receive consideration in laying out a fruit garden, said Mr. G. Hauschild in the course of a paper on the above subject, was the selection of a site. This should consist of a block of land with red, loamy soil overlying a clay subsoil. Six months before planting the land should be broken up to receive the benefits of the early rains and then broken down to a fine tilth. Care should be taken to see that the trees and vines were planted in straight lines. For a farm garden he favored planting at a distance of 20ft. by 20ft., so that a horse could be worked comfortably between the rows. Holes should be sunk 2ft. by 2ft. by 1½ft. deep, the bottom soil loosened with a pick, the hole refilled, and then a hole made sufficiently large to take the tree with its roots spread out. The trees should be planted at the same depth as in the nursery. The soil should then be pressed down around the tree, taking care to hold the tree so that it did not sink too deep. A bucketful of water applied immediately would help to pack the soil around the roots of the tree. After the water had soaked away the surface soil around the tree should be loosened. Fruits recommended for the district were apricots, peaches, plums, and figs. Apples would do well if planted where water could be drained on to them. The vines should be planted 20ft. by 10ft. apart in a hole 18in. by 18in. by 18in. deep. Varieties favored by the writer were Black Prince, Muscatel, and Doradillo. (Secretary, Mr. H. Matthews.)

#### COLLIE.

The annual meeting was held on August 7th. A report of the year's work was tabled and officers elected for the ensuing 12 months. (Secretary, Mr. D. Gunn (Mount Cooper).)

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

August 6th.—Present: 14 members and six visitors.

CO-OPERATION.—In the course of an address, "The Benefits of Co-operation," Mr. G. Payne explained the growth of co-operation throughout the world during the last decade. Russia, China, Argentina, and the United States of America had all adopted co-operation methods in buying and selling practically every commodity for the benefit of their members. Great Britain supplied the wants of nearly half of its huge population through its various co-operative societies. He dealt fully with the marketing of wheat through co-operation. (Secretary, Mr. W. Cooper.)

GOODE WOMEN'S (Average annual rainfall, 10.20in.).

Fourteen members and 14 visitors attended the annual meeting of the Branch, which was held on August 7th, and the report of the year's work was presented by the Secretary, Mrs. A. Watson, of Ceduna. After formal business had been transacted, the meeting took the form of a social evening. Delegates were present from Maltee and other neighboring Branches, and a most enjoyable evening concluded with dancing and supper. Mrs. Fagan donated a cake, a piece of which was handed to each member, in recognition of the first annual meeting of the Branch.

GOODE WOMEN'S (Average annual rainfall, 10.20in.).

The meeting of September 10th was attended by 10 members, and took the form of a Question Box. Subjects discussed included "Bread-making" "Preparation of Yeast," etc. (Secretary, Mrs. A. Watson, Ceduna.)

GOODE WOMEN'S (Average annual rainfall, 10.20in.).

Ten members and visitors attended the meeting held on November 5th, at which general business was transacted.

A meeting was also held on October 8th. Mrs. D. Fogan presided over an attendance of seven members. Mrs. Fogan and Miss C. Peach reported on the Adelaide Congress. Miss E. Campbell (Dip. Dom. Econ. of the Education Department) delivered an address, "Diets in the Home." (Secretary, Mrs. A. Watson.)

GREEN PATCH (Average annual rainfall, 26.56in.).

September 4th.—Present: 15 members.

EARLY FODDERS FOR SHEEP.—The monthly meeting was held at the residence of Mr. E. Chapman. In introducing the above subject for discussion, Mr. Sinclair said there was always difficulty in preventing sheep from losing condition during the early part of winter. He had tried the practice of understocking some of the paddocks during the previous year in the thought that the high, dry grass would protect and encourage the growth of early feed, but it had not proved successful. Mr. A. Schwerdt favored



sowing rye and oats in April in the previous year's stubble, and that usually provided early feed for the sheep. Most members favored the practice of drilling in oats and barley very early on the stubbles aided by hand feeding on chaff. Mr. S. Baillie stated he had had good results from kale for winter feeding. It was generally agreed that more attention should be paid to the growing of lucerne. (Secretary, Mr. C. Whillas, Port Lincoln.)

#### KOPPIO (Average annual rainfall, 22.40in.).

Meeting held August 12th. Present: Mr. W. Cooper (Chair), eight members, and two visitors. The Secretary read an article dealing with the harm done to horses and tractors by overloading. (Secretary, Mr. M. Gardner.)

#### PINBONG.

August 9th.—Present: 12 members.

**FALLOWING.**—The meeting was held at the residence of Mr. A. Scholz. Mr. A. Scholz read the following paper on the subject, "The Advantages and Disadvantages of Fallowing in this District":—"This district still being in its infancy, most farmers have not yet been able to adapt themselves to systematic farming. Land cannot be continually cropped without spelling the land and fallowing. The advantages of fallow are well noted in all districts by yield reports, therefore it is essential to fallow, to give the land every possibility of yielding as much as possible. Plough the soil about 3½ in. to 4 in. deep in June and no later than the middle of July. Do not try and fallow in September and October and expect good results. Plough the soil when it is in a wet condition, irrespective of weeds; weed killing can be done with the cultivator in a later operation. The main object of fallowing in this district is to conserve moisture so that in the following year the growing crop has sufficient moisture to resist any dry spells which are apt to check its growth. After the soil has been ploughed in June and then cultivated towards the latter end of July, and good rains are favorable in August, I suggest cultivating it again. **Disadvantages of Fallow.**—The soil not having enough clay in it, causes no end of trouble trying to keep the fallow in the right paddock and keeping the fences from being drifted over. Farmers often turn a flock of sheep on the fallow to cope with the few weeds which the implements have not destroyed. This is a mistake, because the few little clods and rough surface of the ground soon becomes powdered by the hoofs of the sheep and it is impossible to hold the drift. Even if the paddock is cultivated again, the soil being fine is soon levelled again by the severe winds. The only way to prevent the soil from drifting in this district is to leave a certain amount of stubble in the paddock chosen to be fallowed. Never burn the stubble in the paddock that is to be fallowed or have it eaten out bare with a flock of sheep. When a small amount of stubble is turned in with the plough and worked up again with the cultivator it breaks the sweep of the wind. After the three operations mentioned have been completed, harrow the paddock after a further rain. This will pack the loose soil, bring the tiny clods to the surface, and be a further preventive of drift." (Secretary, Mr. C. Scholz, Yaninee.)

#### PINKAWILLINIE.

The meeting of August 9th was held at the residence of Mr. W. Miller, there being present eight members. An interesting paper, "Tractors, Trucks, and Travellers," was read by Mr. Halliday. (Secretary, Mr. S. Johnson.)

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## PYGERY.

September 2nd.—Present: 23 members and three visitors.

**HINTS CONCERNING MALLEE FARMING.**—In the course of a paper under the title "A Few Errors Common to Farming in the Mallee," Mr. E. Day said the most common mistake was the continual sowing of large areas of wheat. Better worked smaller areas, in conjunction with a good rotation, should ensure more reliable returns. In other than drought years they could grow oats, barley, or peas, which could be profitably fed to stock. Lucerne, Wimmera rye grass, and other fodder crops, with the yearly growth of grasses and weeds, would enable them to carry a large number of stock. In putting their dependence solely in wheat and wool they were taking too great a risk. No other country in the world depended on such a meagre diversity of products from the land. The success or failure of the wheat crop to a large extent determined the financial solvency of both the farmer and the country, and as so many adverse influences affected the chances of a full crop of this product, their assurance of financial stability was far from strong. Farmers were prone to plant large areas each year, often on land previously carrying the same crop, instead of smaller better worked and manured areas, grazing or some other crop always to follow wheat. Another error was to discard a good wheat that had done well over a number of years for a new one that had suddenly given a heavy yield in some other district. It might be quite unsuitable under different conditions, besides possibly introducing some disease. Again, one sometimes heard the statement that wheat would deteriorate if grown in one district too long, but with care in selection and keeping it free from other varieties it would rather improve year by year. Many farmers failed to conserve sufficient reserve stocks of fodder from good years to carry stock over the dry periods. Other mistakes made were keeping stock after it had reached its best marketable age and condition, the cutting down of thousands of acres of magnificent mallee, titrees, or pines containing fine fencing posts which were burnt in the hurry to clear the land. Noxious weeds could often be prevented from getting a hold on the farm by destroying perhaps only one or two odd plants on their first appearance. Wild mustard (although a bad weed in a crop) was a useful fodder plant. Discussing the paper, Mr. Humphries did not favor growing wild mustard as a fodder crop. Mr. Symonds agreed that farmers should store more reserve fodder for stock, and believed in better cultivated and manured smaller areas. Mr. E. Edmonds considered that wheat would always be the main line of production. He thought they should conserve all cocky chaff and grow more oats, and store them loosely in a shed just as they were reaped with the stripper. Mr. W. Heath said the farmer should put in as large an area as possible and thereby get his holding cleared as soon as possible. (Secretary, Mr. E. Day.)

## ROBERTS AND VERRAN.

August 6th.—Present: 14 members and eight visitors.

Mr. H. D. Adams (District Agricultural Instructor) gave an address, "Control of Sand Drift." Mr. Adams also gave a demonstration with the Babcock milk tester. (Secretary, Mr. C. Masters.)

**FODDER CONSERVATION.**—At the July meeting the following paper was read by Mr. M. Masters:—"Dry seasons have again brought home to producers the necessity for conserving fodder in good seasons. Every farmer should sow at least 10 acres of fallow with oats for every working horse kept. Stubble land should be sown with oats, sowing at least 1 bush of seed per acre, preferably Algerian, as these stand rough conditions better than other oats. As much hay as possible should be cut every year, and what is not required for the following year should be stacked separately, mouse-proofed, and covered with straw. Always put plenty of straw on to make sure that the rain does not soak in. Straw should be cut and stacked whenever possible and salt sprinkled on each layer. Where a large area of oats suitable for hay is grown, a portion should be cut green and chaffed immediately into a pit and ensilage made of it. This is a very valuable fodder; it retains the green feed properties and is ideal for feeding to stock during the summer. A pit 10ft. deep and 20ft. in diameter should accommodate 30 tons of ensilage. Ensilage will not burn and will store for an indefinite period. Any green feed can be cut or used and stored in bulk, but chaffed fodder is preferable. All cocky chaff should be saved and covered with straw. If covered properly it will keep for years. A large straw shed should be provided and filled each year, away from stables in case of fire. If ensilage is conserved and cocky chaff saved, they can be fed to stock, and especially to ewes and lambs. The cocky chaff for bulk and the ensilage having the green-feed properties, will be excellent in the absence of the green feed in the paddocks. All stock should be paddock-fed as much as possible in order to save the conserved stocks of hay, cocky chaff, or ensilage. If these few items are put into practice there should be little trouble through feed shortage."



**STREAKY BAY** (Average annual rainfall, 14.95in.).

Nine members attended the meeting held on August 15th. Matters of local and timely interest were discussed. (Secretary, Mr. C. Thom.)

**TALIA.**

The monthly meeting of the Branch was held on August 11th, and was attended by 22 members and three visitors. The annual report was presented and officers elected. Mr. W. Brownrigg (District Instructor) delivered an address, in which he dealt with various phases of farm activities. (Secretary, Mr. A. Thompson, Elliston.)

**TALIA** (Average annual rainfall, 15.27in.).

Mr. F. Elliot presided over an attendance of 11 members at the meeting held on August 29th. Members reported considerable trouble with the blowfly pest in sheep, and several useful home-made remedies were suggested. (Secretary, Mr. A. Thomson.)

**TARAGORO.**

Meeting held September 4th.—Present: 14 members and four visitors. An instructive paper, 'Farm Management,' was contributed by Mr. A. Crooks. (Secretary, Mr. T. Winters, Cleve.)

**WALLALA.**

August 13th.—Present: 13 members and visitors.

**PIGS AS A SIDE LINE TO WHEATGROWING.**—Mr. J. Thompson read the following paper:—'*Selection of Pigs.*—Secure as near pure-bred stock as possible for breeding purposes, and favor a Berkshire boar mated with a Tamworth sow. Select a sow with at least 12 teats, and whilst she is developing do not allow her to become too fat. *Care of Sow and Young.*—If possible provide the sow with the run of a small paddock until about two weeks before farrowing, then it is best to shut her up away from the other pigs. On no account overfeed the brood sow; if she is too fat she will become clumsy and is likely to kill the young pigs. After farrowing give the sow three small feeds a day. Skim milk and crushed wheat is a suitable feed for the first two or three days after the pigs are born. When four weeks old the young pigs should be provided with a trough, out of which they can feed themselves. Warm quarters in winter which can be well ventilated in summer are essential to the good health of the sow. On hot days water can be poured on the ground to assist in keeping the pigs cool. A young sow should not be mated until she is at least 12 months old. Best results will be obtained if regular feeding hours are observed. I feed boiled wheat and water. Allow a 6lb. tin of wheat to each pig of about six months of age. Do not stint the young pigs in their feed. When the pigs are ready for topping up feed them as much as they will eat. Charcoal should be allowed two or three times each week, it helps to keep the pigs healthy. A pig at eight months old weighing 180lbs. to 190lbs. will nearly always find a ready sale. The paper concluded with cost of feeding and sending the pigs to Port Lincoln. (Secretary, Mr. C. Zippell.)

**WIRRIILLA WOMEN'S.**

September 5th.—Present: 10 members.

On the occasion of the annual meeting the election of officers took place. Mrs. Blatchford supplied the following recipe for soap making:—6½lbs. fat, 2galls. water, one tin caustic soda, ½lb. borax, ½lb. resin. Simmer for two hours, and when cool add two cupfuls of kerosene.

The meeting of October 2nd was held at the residence of Mrs. Blatchford, there being present 12 members and three visitors. A lengthy and instructive report of the proceedings of the Annual Congress was tendered by Mrs. Woods.

**PUFF PASTRY.**—The following recipe for making puff pastry was supplied by Mrs. Blatchford at the meeting held on November 5th:—Take equal quantities of butter and flour and a pinch of salt. Sift flour and add one teaspoonful of lemon juice, or, failing the latter, as much cream of tartar as will lie on a shilling. Mix the ingredients to a pliable dough with cold water. Flour a cloth, place the butter in it, and roll to remove as much moisture as possible. Then place it in the centre of the dough, which has been rolled into a square. Fold same over and put away in a cool place for at least a quarter of an hour, and then roll out, fold, and put away again. This should be repeated three times. Finally, roll, but not too hard near the edges of the paste. Cook in a hot oven. Fifteen to 18 minutes will be required for tarts. Keep everything as cool as possible whilst handling the paste. (Secretary, Mrs. W. Jones, Auburn.)



## EASTERN DISTRICT.

## (EAST OF MOUNT LOFTY RANGES.)

ALAWOONA (Average annual rainfall, 10.20in.).

August 25th.—Present: 11 members.

**LAMB MARKING.**—In the course of an address on this subject Mr. Burnett, of the Caliph Branch, recommended marking lambs when they were from three to five weeks old. For the operation of marking he recommended the knife. The end of the purse should be removed to provide for proper drainage of the wound. For earmarking six different marks were required—one for each of six years—marking ewes on the off side and wethers on the near side ear. Replying to a question, Mr. Burnett said the Brands Act stipulated that it was not legal to take out more than  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. from the ear. It was stated that a farmer could choose his own design for an ear mark. Mr. Burnett mentioned that he did not favor the removal of the testicles with clams. (Secretary, Mr. B. Flint.)

## BERRI.

September 8th.—Present: 20 members.

**UNDERGROUND DRAINAGE.**—Mr. H. Garde, B.E., of the Irrigation Department, read the following paper:—“*Seepage.*—Seepage is caused by the accumulation of surplus irrigation water, after an irrigation, when the natural drainage is defective, and can only be removed by underground drains. This is the simplest case to deal with, and in every one that has come under my notice, where vines and trees have been affected by a rising of the water table, an immediate improvement has been effected by the laying of a drain. *Salt as the Result of Seepage.*—This is a more difficult problem to deal with, and is caused by growers failing to attend to seepage patches. It is due to a gradual concentration of salt which has been taken into solution by the action of water passing over salty country. Where the natural drainage is defective, this salt-laden water accumulates, rises to the surface by capillarity, is evaporated, and the salt is left behind on the surface. So it is necessary for all irrigationists to test immediately any suspected seepage patches, and if there is water showing, to immediately instal a system of drainage before the point is reached when the salt begins to concentrate more on the surface. *Salt.*—Portion of the Murray lands are naturally salty, and these are most difficult to deal with, because the impervious clay is generally very close to the surface, which makes good drainage almost an impossibility. The cause of the land becoming affected with salt at an early stage is as follows:—Irrigation water which may be quite free from salt if poured on to this land, and the water sinks down to the clay, at the same time taking into solution the salt contained in the surface soil, as well as the subsoil, with the result that a solution heavily charged with salt has accumulated on that clay. This salt solution rises to the surface by capillarity, the water disappears as vapor, and the salt remains on the surface as in case two, but in larger quantities, and the only means of recovering land of this class is by flooding and intense drainage. The effect of seepage on trees and vines is a spindly growth, falling off of crop, and general weakening of the plant until death ensues; the effect of salt as the result of seepage is similar to seepage, but with characteristic blackening and curling of the edges of the leaves. The most effective method of dealing with seepage or salt is by underground drainage, and I advise all growers in this area to keep a watchful eye on any suspicious patches and immediately try those patches by test holes or trenches. The latter are generally very inconvenient on a fruit block, and test holes are more often adopted as the most convenient method of investigation. Several of these test holes should be put down in any suspected spot and lined with down piping. Any change in soil should be noted, and the clay depth accurately determined; water level noted 24 hours after boring when the watertable will have reached its correct level; and the rise and fall of this watertable observed during and after irrigation. For an extended seepage area, several test holes put down at regular intervals in 1 to 1½ square chains are necessary, so that a contour of the impervious claybed can be determined. This is absolutely essential before an efficient scheme of drainage can be evolved, for it is impossible from surface indications to locate the most effective position for the drains. These holes are generally bored to a depth of 6ft. or 7ft. or to the clay-bed. The locations of these test holes are then plotted on a plan, the clay contour determined, any depressions or bars noted, and a design prepared to give the maximum effect. The drainage scheme is then pegged out on the ground, levels are taken at each chain, and grades worked out, keeping in mind the clay depths obtained in the test holes to determine the depth to which the drain-tiles are to be laid. In the work in this area a standard of 5ft. has been adopted, but this is varied according to the results obtained in the test holes.



**Methods of Construction.**—The first consideration is an outlet for the drain water. This consists of (1) a direct outlet to the river flats; (2) a main drain to the river; (3) a seepage shaft; (4) a seepage bore. Direct outlet to the river is very satisfactory, and consists of a sump on the boundary of the block, and either tiles or pipes leading to the flats at such a length as to provide a good getaway for seepage water. **Main Drains.**—These are mostly constructed of concrete pipes, and have been installed where a fall can be obtained to the river. Sumps are constructed on these mains—generally on the lowest point of each block encountered for the purpose of collecting drainage water from the blocks, settling silt, and for observation purposes. **Seepage Shafts.**—Where no main drain is available, seepage shafts have been sunk to drainage sand, which is struck at approximately 40ft. in the Berri area. These shafts are close timbered in with 6in. x 2in. jarrah, and are 4ft. x 2ft. in the clear. A ladderway is built down each shaft, and a heavy door provided. A sump is constructed either of timber of the same dimensions as the shaft or of 30in. reinforced concrete pipe, and connected to the shaft by 4in. or 6in. reinforced concrete pipes. The block drains are connected to this sump, which serves the purpose of collecting any silt contained in the block drainage water, and prevents it from fouling the sand in the shaft. In most cases these shafts have proved very efficient, but they require cleaning out periodically. **Seepage Bores.**—Where it has been found impossible to sink a seepage shaft, owing to the nature of the country, 4in. bores have been put down to drainage sand. These are not so satisfactory as shafts, owing to the very restricted drainage area afforded by a 4in. pipe, but with care and attention they will deal with an enormous amount of water. **Block Drains.**—The block drains after the grades have been determined are commenced at the lowest part of the block, the trench is excavated to within 3in. or 4in. of the final depth, and pegs are then bored in to the correct depth or grade 4ft. or 5ft. apart, and the last 3in. or 4in. of soil trimmed off to the level of these pegs, leaving the bottom of the trench true to grade. The tiles are then laid on this finished bottom, the joints covered with strips of tarred or waterproof paper for two-thirds of the circumference, and the tiles consolidated with earth to prevent any displacement; a No. 10 galvanised wire is drawn through the tiles as the laying proceeds. These wires are for cleaning purposes, and should be pulled through at frequent intervals to prevent the accumulation of silt in the tiles. In salty ground these wires should be renewed every 12 months, because the salt water eats them away. Where the trench is in soft ground, it is impossible to peg the bottom, and each tile is bonded in as it is laid. This is the most expensive method of laying, for it requires the services of one man sighting all the time, whereas in the first method the man sighting in the pegs is only needed for a short period, and he can then go on excavating ahead of the man laying the tiles. **Inspection Sumps.**—Inspection sumps, consisting of 18in., 21in., or 24in. reinforced concrete pipes are constructed at 5 chain intervals, or at the bend or junction. These are for collecting silt, the bottom being set 2ft. below the trench line and for observation purposes, and to isolate any section of drain that may have become choked. In soft ground these sumps are set vertically on 6in. by 12in. jarrah. The inlet and outlet tiles are cemented to the sump pipes, and the cleaning wires are brought to the top and fixed to the lid. The diameter of the tiles to be used is determined by the length of the drain and the available grades. Nothing less than a 3in. tile is advisable for grades over 3in. to the chain, and for grades less than 3in. to the chain a 4in. tile is essential. Generally speaking, where a drain is over 20 chains long, the lower half of the drain should be laid with 4in. tiles. **Cost of Construction.**—The cost of construction is, of course, governed by the cost of labor, which represents at the present time approximately two-thirds of the total cost, and as a general rule in estimating labor costs, three men should complete over 1 chain of drain per day in good average ground with a 5ft. trench. It will be seen from the foregoing remarks that drainage is a costly operation, and I advise all blockers who are installing a drainage system to make a thorough subsoil investigation before finally determining the location of such drains, so that they may have the maximum effect over the shortest length of drain, the latter item being especially mentioned from the fact that while salt is being removed from the land, other valuable properties in the soil are also being removed, as well as plant food artificially applied in the way of soluble manures. In conclusion, I would emphasise the necessity for all those who have evidences of salt on their blocks to make an immediate drainage. These plague spots if given immediate attention can be cured in a comparatively short time, while if left to grow they may take years to eliminate." (Secretary, Mr. E. Johnson.)

#### BOOLGUN.

Mr. R. L. Griffiths (District Agricultural Instructor) addressed the meeting held on September 3rd on the subject, "Crop Rotation for the Mallee Areas." There were present 24 members and two visitors. (Secretary, Mr. J. Palm.)



**BRINKLEY.**

Twenty-one members and three visitors attended the meeting held on September 3rd, when Mr. R. Hill (District Agricultural Instructor) delivered an address, "Crop Rotation." (Secretary, Mr. C. Pearson.)

**COOMANDOOK** (Average annual rainfall, 17.45in.).

Mr. B. Crews, of the Vacuum Oil Company, delivered an address, illustrated with moving pictures, "Petroleum and Its Products." There was a large attendance of members and 50 visitors. (Secretary, Mr. W. Trestrail.)

**COPEVILLE** (Average annual rainfall, 11.58in.).

One of the best meetings yet held under the auspices of the above Branch took place at the residence of Mr. G. Sutherland on September 4th. During the afternoon an attendance of 35, including members and visitors, spent a most instructive afternoon inspecting the departmental plots being conducted on Mr. Sutherland's farm. In the evening an address dealing with the subjects, "Fertilisers," "Wheat Varieties," and "Crop Rotations," was delivered by the District Agricultural Instructor, Mr. R. L. Griffiths. (Secretary, Mr. G. Sutherland.)

**LOWBANK.**

September 3rd.—Present: 13 members and three visitors.

Mr. A. H. Kuchel read a paper on "The Most Suitable Horse for this District." He advocated a medium draught for the district, the heavier horse consumed more feed, whereas the clean-legged horse did the same amount of work with less feed, and the medium horse would stand up to more paddock feeding. A good discussion followed by members, who were all of the same opinion, with the exception of Mr. E. Nitschke, who said if possible one should keep one or two heavy draughts in order to be handy when a strenuous pull presented itself. The lighter horse would need excessive strain to do the same work. (Secretary, Mr. L. Geyer, Waikerie.)

**MARAMA.**

Twenty-four members and four visitors attended the meeting held on September 6th. Matters relating to the Annual Congress and Crop Competitions were discussed. (Secretary, Mr. T. Hinkley.)

**PINNAROO WOMEN'S.**

October 3rd.—Present: 26 members and visitors.

**VEGETABLE GARDENING.**—Mrs. Hawthorne, who won first prize in the Vegetable Gardening Competition conducted under the auspices of the Branch, read the following paper:—"Choose a position sheltered on the north and western sides. During November the land should be covered thickly with well-rotted manure, and dug in fairly deep. Then leave it until it is time to measure and peg out the rows for the different vegetables. For carrots, make a trench with the hoe, sow the seeds fairly thickly, water them well, and keep all weeds pulled, and carrots thinned out when the small plants have made a good start. Parsnips are best sown 10in. to 12in. apart, with two to three seeds in each place. They can then be pulled up, leaving only one to grow. Cabbages and cauliflowers should be sown in pans or boxes in March, so that they can be planted in April. Always choose a dull day for transplanting, and water every morning and evening to prevent them from getting a check. Plants that have been left in the dishes too long run up to seed very quickly and do not form a nice heart. Drumhead is the best variety; they last quite a long time after they form a heart, if they are covered with leaves to protect them from the sun and damp. Phenomenal Maincrop Cauliflowers are a good variety. They take six to seven months to grow. They should have plenty of water and be kept free from insects and grubs. A little sulphur put in a sugarbag and shaken over them keeps out the grubs and insects. Spraying is necessary to check aphids. Beetroot is best sown in a dish, so that it can be planted out evenly in rows. Crimson Globe is a good sort. Peas should be sown in April; if climbers, a trellis should be provided. Onions must be planted out in April and not given too much water. They are best planted on one of the outside rows. The roots must only be put in the ground, and then as they are growing the soil kept away from the bulb, so that it is above ground. The tops can be bent over when they are about 1½ins. through. Lettuces planted out in the beginning of July and kept watered will grow quickly. Radishes can be sown in August. The ground must be hoed and loosened about every week, and given an occasional good soak in water."

Meeting held November 7th. Present: 15 members and two visitors. Miss Kelly gave a report of the Annual Congress. Miss O'Loughlin gave some useful hints on cooking. (Secretary, Mrs. F. Atze.)



**PARILLA WOMEN'S (Average annual rainfall, 14.15in.).**

September 11th.—Present: 20 members.

**QUESTION BOX.**—The following questions were submitted and answers supplied by various members:—Why does sponge cake go flat when taken out of oven? Reply—Insufficiently cooked or taken out of oven and placed in draught. Correct way of jointing poultry? Reply—Cut off legs and divide each into two portions, then cut off wings, slice breast, and break carcases in two. How to mix correct ingredients for sponge sandwiches? Three eggs, half cup sugar, 4 tablespoonfuls cornflour, 1 tablespoonful plain flour, bare teaspoonful cream tartar,  $\frac{1}{2}$  teaspoonful carbonate soda. Beat eggs until frothy, then add sugar, and continue beating until thick and frothy (about 20 minutes). Sift cornflour, flour, and mixing together two or three times, then add all to egg mixture and stir lightly until well mixed. Bake in fairly hot oven. How to bake a good egg custard? Reply—Beat 2 eggs into a pint of milk, adding a little sugar and flavoring. Place dish in pan of water if oven is hot or in a moderate oven without water. How to make marble cake? Reply—One cup butter,  $1\frac{1}{2}$  cups sugar, 3 cups self-raising flour, 4 well-beaten eggs, 1 cup milk. Beat butter and sugar to a cream, add eggs well beaten, then milk and flour. Divide into three parts; color one part with cochineal, one part with cocoa, and leave one plain. Drop spoonful of each in dish until all is used. Bake in moderate oven. How to make and bake a sponge roll? Reply—Same recipe as for a sponge cake. To bake, put sheet of brown paper on oven tray, pour sponge mixture on paper, and bake until cooked; turn out, then take a damp cloth and rub over paper, when it can be removed easily from cake; spread with jam and roll quickly. How to feed young ducks? Replies—(a) Feed with hard boiled egg and breadcrumbs for a few days, then mix bran, pollard, and chopped green food with milk or water. (b) Give mash from hatching. What makes butter cheesy? Reply—Keeping cream too long before churning. Best cure for sore teats on cow? Reply—Mix together equal parts vaseline and lard and apply. Best time to hatch turkeys? Reply—August and September. Cause of fruit rising to top of bottle after preserving? Reply—(a) Bringing water to required temperature too quickly; (b) overripe fruit; (c) syrup too sweet.

Meeting held October 16th. Present: 17 members. Delegates' report on Annual Congress was received and discussed.

**TOMATO GROWING.**—The following paper was read by Mrs. Phillis at the meeting held on November 19th, which was attended by 22 members:—“In this district seed should be planted in pots or tins in June and July. If tins are used, holes should be punched in the bottoms of the tins. Cover the holes with charcoal. Fill with rich soil and sprinkle in the seeds, not too thickly. Cover the seeds with sand, place the pots or tins in a heap of stable manure, sloping a little towards the north, and cover with a glass frame. Always keep the soil moist. When the plants are about 1½ins. high take the glass off in the daytime. This makes the plants strong and hardy. Care should be taken to always cover them at night. Prepare the ground, selecting for planting the plants by giving it a heavy dressing of well-rotted stable manure from 2ins. to 1½in. thick and a sprinkle of bonedust, and dig it in about 5ins. deep during August. When ready for planting give it another application of bonedust and dig again. When the plants are ready to transplant, space them 2½ft. apart, in rows 3ft. apart. Cut kerosene tins in halves, leaving two sides and the one end on each, and place one half over each plant. Leave these over until there is no danger of frosts. Water every other day until the plants flower, when a thorough soaking once or twice a week will suffice. Prune the

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plants by nipping out the shoots just below a bunch of flowers. When frosts are over, remove the tins, place 4ft. stakes beside each plant, and tie carefully. The following varieties are recommended:—Early Dwarf Red, Early Jewel, Burwood Prize, and Ponderosa." (Secretary, Mrs. Welden.)

#### PARILLA WELL WOMEN'S (Average annual rainfall, 14.94in.).

Meeting held September 30th. Present: 16 members. An interesting report was received from the delegates who attended the Annual Congress. (Secretary, Miss S. Burford.)

In the November, 1930, issue of the *Journal of Agriculture*, page 438, the report under the heading of Parilla Women's should be Parilla Well Women's.—[Editor.]

#### PARRAKEE WOMEN'S (Average annual rainfall, 14.54in.).

November 24th.—Present: 16 members and 23 visitors.

Mr. F. C. Richards (Assistant Secretary of the Agricultural Bureau) addressed the meeting. Mrs. Pritchard, of the Wilkawatt Branch, reported on the Adelaide Congress. (Secretary, Mrs. M. Cabot.)

#### TAPLAN.

After having been in recess for some months, an excellent meeting of the Branch was held on August 20th, there being present Mr. W. Hammond (Chair) and 12 members. Officers for the ensuing year were elected (Secretary, Mr. P. Hodge, Nangari.)

#### WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).

Meeting held October 30th. Present: 10 members. The report of the delegates who represented the Branch at the Annual Congress was received and discussed. (Secretary, Mrs. A. Oram.)

### SOUTH AND HILLS DISTRICT.

#### BLACKWOOD (Average annual rainfall, 27in. to 29in.).

September 8th.

Mr. F. James presided over an attendance of 11 members. Mr. G. Summers addressed the meeting on the subject, "The Root Growth of Trees after Receiving an Application of Sulphate of Ammonia." (Secretary, Mr. B. Quinn.)

#### GUMERACHA (Average annual rainfall, 33.54in.).

The meeting held on September 1st, which was attended by 12 members and two visitors, took the form of a debate on the subject, "Bores v. Dams." Mr. H. Hanna spoke in favor of bores and Mr. V. Lee supported the advantages of dams. An interesting discussion followed. (Secretary, Mr. L. Wise.)

#### INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

August 21st.—Present: seven members and four visitors.

**ERECTION OF THE HOMESTEAD AND OUTBUILDINGS.**—The following paper was read by Mr. W. Mayfield:—"The first consideration should be the site and the layout of the various buildings. Buildings are put up to remain for a good number of years, and it is well worth while considering selecting the best site possible. The following points are well worth considering when selecting the position of the homestead:—1. As central as possible, but not overlooking the necessity for easy access to the main road. 2. On rising ground to ensure a fall for drainage waters. 3. Gravelly ground is the best to build on; it ensures dry and clean surroundings during winter months; failing this, sand is next. 4. Water supply from higher ground if possible. 5. Place the homestead in front and the other buildings at the rear, as sometimes it is to the reverse. 6. *Cost of Construction.*—This is a matter of discretion. I maintain that the average farmer must build a home in accordance with his natural income. By this I mean it is no good in building an elaborate home on a small holding which has not the producing qualification in paving the way for its inhabitants. After having made your plans, and having the lay-out of your homestead, one can then endeavor to commence with the construction. That is, providing you have the stone carted and put in a symmetrical shape from where the structure is to be erected. I have unanimously decided on a stone building as the surroundings are adapted to good building stone. But where stone is scarce, as it is in some districts, it is a debatable question whether stone buildings are preferable to iron ones. The foundation should be concreted with a damp-proof course, preventing the dampness rising up through the walls. These two points have only come into vogue of recent years, but no doubt they will remain, as they both aid the life of the

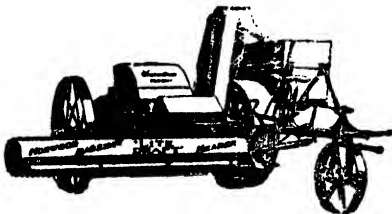


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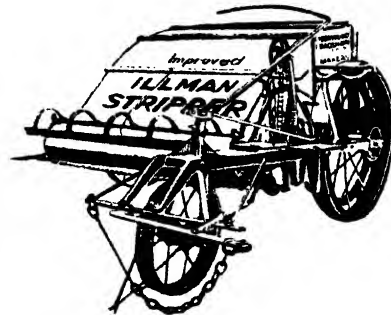


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building. I suggest having a six-roomed house, with a verandah at all sides, which keeps the effects of the sun and rain from the walls. A laundry and bathroom can be made by enclosing the back verandah in, which are both essential to an up-to-date home. The kitchen should be a moderately large room, thus giving the women folk more freedom. This is the most used room in the home, so the most attention must be given to make it as convenient and as comfortable as possible. No home is up to date if it is lacking in way of convenience. By having the water laid on from the higher ground into the kitchen it gives the household folk a good deal of extra time. Every possible effort should be considered, in the way of making work a pleasure, whereas if no convenience, one has a lifelong burden. *The Site of the Home.*—The front should face east or north, having the back portion screened off by the outbuildings, and trees cutting out the south and west winds from which our district suffers generally. The outbuildings should be screened off from the homestead, excepting the motor garage, preferably by a plantation of trees or a hedge. Avoid erecting buildings in such a manner that the prevailing winds blow straight from the farmyard to the house. As far as possible keep the general layout of the buildings in a rough quadrangle. The buildings should be placed so that those most used are nearest the house, probably in this order:—Car or buggy shed, workshop, fowls, pigs, cowshed, stables, and shearing-shed. The surroundings to these buildings should be kept as clean as possible. Do everything to avoid a boghole in the winter. The first building, namely, the motor garage, should be built with stone; as it is the nearest building to your dwelling, why not keep it up to the same standard. The measurements which I think most suitable, 18ft. x 10ft. clear space, giving yourself plenty of room for minor repairs; also a pit is very serviceable, as it enables one to do his jobs more easily. This can be concreted with 3in. thickness of the walls and the floor 2in., which prevents the water from soaking in; if not treated in such a manner it will be very little use. The second building I have considered to be the next most used should be built by the man on the farm; not necessarily to be as elaborate as the garage. This could be built with timber and iron, but do not overlook the fact in making it too small. If it is a solid construction, and its contents are plentiful in the way of carpenter's tools, one will occupy a lot of his time in this building, especially in the winter time. *The Fowl, Pig, and Cow Sheds.*—These can all be built by the owner if he is studying finance, and a very satisfactory job can be done. They all will show a profit if built in an up-to-date fashion. As we all know, if animals are taken greater care of they will return a bigger profit, so why not give all the attention in making this building as up to date and as comfortable as possible. In building the fowlhouse I advocate an iron roof, closed in with iron on three sides, leaving the front exposed to the east. The perches should be old pipes, as these leave no harbor for vermin. A netting yard surrounding the house will enable them to have the required amount of liberty. The pigsty should be built of stone, with concrete floors, with a gradual slant to the middle, thus enabling all liquid matter to be cleared. *The Cowshed and Stable.*—These two buildings would be better built of timber and iron. The former could be made to house three or four cows. These, cared for properly, would produce more than the unhoused ones; each having its own stall and feedbox, with a vacancy at the front to enable one to feed more easily than coming up from the rear. The stable could be similarly built, having an extended shed at the end where food could be stored, such as chaff and hay and such like. The last building I have chosen is the shearing-shed, as it is used only once a year to any extent, but can be used for storage of super and miscellaneous articles. The measurements for this building I have chosen from William Cooper's Note Book:—Length 40ft. x 30ft., which is the required size for the average grazier. It is advisable to build off the ground, which gives you another sheltering quarter under the shearing board. By having the building off the ground one has to overcome the difficulty in penning the sheep. This can be overcome to some extent by the use of a ramp leading up to the entrance-door by a gradual slant. The ramp can be made of the same material as the grating. These measurements are 1½in. x 1in., leaving a space of three-quarters of an inch for clearance of rubbish. The entrance-door should be made to slide. This can apply to all doors and gates within the building, as it is less trouble than closing a gate in a crowded yard. The sheep having entered the shed, should be raced off on either side, where the yard on the left can be used as a holding-pen and the one on the right can be used as catching pens. This plan gives ample room for four shearers, allowing two shearers for each pen, so the catching pens can be divided into two compartments, each measuring 9ft. x 12ft. The shearing board should be at least 9ft. wide, to enable the woolpicker to walk along at the back without interfering with the shearer. Each shearer should have a porthole for disposal of his sheep, entering into a small private yard, which would be most beneficial for employee as well as employer. The remaining area, 12ft. x 30ft., would be utilised for rolling and storage, with another sliding door for the exit at the opposite end from entrance."



**FENCES.**—Mr. E. B. Stone read the following paper:—"One of the first moves to make on securing a farm or grazing property is to put the fences in order, especially the ring fence. Good fences add to the attractiveness of a farm, and such will, if in case of sale, greatly help in securing the full value of such. To have good fences in almost every case you will have good and friendly neighbors, for most of the troubles between neighbors start with stock trespassing, all through fences being out of order. One of the most important items in erecting a new fence is to secure good pink gum split posts, 5ft. 8in. long and 4in. to 5in. across the top, and strainer posts 7ft. long and 12in. across the top. The pink or sand-gum is by far the superior timber for durability, with the red and blue next. Red gum timber does not last too well in the ground, and the blue gum timber is very subject to white ants. In erecting the fence, have not less than seven posts to the chain, and for the ring fence not under 3ft. 10in. high; a division fence need not be quite so high. I consider a seven-wire fence very superior to a six for a boundary fence, but six wires are quite sufficient for subdivision. It is far better to pay the extra cost and secure all galvanized wire, as the black rusts out so soon, No. 10 galvanized being superior to the No. 8 black. In fencing against horses and cattle, No. 8 wire is small enough for the three top wires. I also prefer to have one barb on top of the posts, or the second wire down, to protect the fence, the second one being my favor, tied with galvanized wire, not staples, or tied with old rusty wire, as it rusts the barb. Also, to have the fence effective, the wires must be strained well, and also kept tight, with each strain from 8 to 10 chains long. I do not consider the cyclone fence as good as the one I have stated, especially for the ring fence; if it is it will have to last for 60 years or more. I have just pulled down a seven-wire ring fence, erected 50 years ago, and it would have lasted another 10 years for some farmers. The 12½ gauge high-tension wire goes a long way, but that is the only point in its favor so far as I have proved. In this district where posts are almost unsaleable the dropper fence needs little comment, as it cannot compare with posts for strength when tested with heavy stock. Another important item is to have good gates, for then you can get from one paddock to another without delay, and I am a great advocate for the cyclone iron gate, in preference to wood, which are quite as cheap and last longer."

**MOUNT PLEASANT (Average annual rainfall, 27-38in.).**

August 8th.—Present: 11 members.

**FARM MANAGEMENT.**—In the course of a paper under the title, "Adversity on the Farm," Mr. D. Learmonth said perhaps the most trying circumstance, and one which was beyond the control of the farmer, was the occurrence of a drought. When the farmer had reduced the stock on the holding to a minimum and the rain still held off, and he was without capital to purchase fodder which suddenly jumped to very high prices, it was very distressing to know that one could do nothing for the stock. Despite these happenings, which had been experienced by many men on the land, he doubted very much whether producers had yet learned any lessons from the drought. Reserves of fodder were an absolute essential to the proper conduct of the holding, and the time to make adequate provision was during seasons of plenty. "Cut an extra stack of hay, and see that precautions are taken to prevent damage to it by mice and rats." Farmers should not overlook the value of a stack of good oat straw. This chaffed, and an allowance of oats added, would do much towards keeping the stock alive. He thought the harvester had been responsible for the comparatively small amount of cocky chaff that was saved. It would prove a valuable asset in times of drought. A good stone wall about 4ft. high would considerably reduce the fire risks so far as the fodder supplies were concerned. Care should be taken not to let the stock get too low in condition before starting to hand feed them. Breeding ewes should not be too fat at the time of lambing. A good plan was to feed them on grass hay with a small quantity of bran, shift them directly they had lambed and give an oat ration. Any weak ewes should receive special attention when hand feeding was started, otherwise they would not get their fair share of the fodder. They could be placed in a small paddock and, if necessary, the lambs given a little milk for a day or two. The provision of shelter in the lambing paddock was an important point in the management of the flock. It was not profitable to feed old or useless stock in times of scarcity. Rabbits on the property should be kept down; they ate much valuable grass which should be utilised by the stock. Mr. Learmonth spoke very strongly against the losses caused by foxes, and urged every landholder to use every effort to destroy them. The blowfly was also responsible for considerable losses to the flock master, and much would be done to minimise trouble if all carcasses were either buried or burnt. The speaker also referred to the loss of grass that followed as a result of cropping, and in districts where the rainfall was sufficient it might be advisable to sow grass seeds immediately the crop had been taken off. Practically every summer there was the menace of fire to be faced by the landholders in the hills districts, and every possible precaution and action should be adopted to minimise danger and loss from this cause. (Secretary, Mr. D. Smith.)



# CROWN LANDS.

## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Adelaide.

## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



# THE JOURNAL

OF THE

## Department of Agriculture

OF

## SOUTH AUSTRALIA.

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ISSUED UNDER THE AUTHORITY OF THE MINISTER  
OF AGRICULTURE.

FEBRUARY 16, 1931.

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**All communications to be addressed:**

**“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”**

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S. R. WHITFORD.  
*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

Lower North, at Lyndoch (Secretary, Mr. J. S. Hammat, Williamstown), February 26th.

Mid-North, at Wirrabara (Secretary, Mr. F. E. Borgas), March 11th.

South-East, at Kalangadoo (Secretary, Mr. J. Dignan), March 18th.

The above Conferences will commence at 10.30 a.m. in each case. Arrangements are being made for special sessions for members of Women's Branches. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

### Should Crops be Sown Without Superphosphate This Year?

"In view of the low price offering for wheat, and the difficulty of financing the purchase of manure, would it be wise to sow the wheat crop without superphosphate this year?"

In reply to this question, Mr. W. J. Spafford, Deputy Director of Agriculture, stated that even though some of our wheat lands had been regularly manured with superphosphate for a long time now, it was still necessary to use this fertiliser with the wheat crops, if profits were to be secured. The improved methods of soil cultivation which had been developed in recent years enabled us to grow much heavier crops than was possible a few years ago, and when good seasons return it was anticipated that high-yielding crops would be common in all of our better wheat-growing districts. Nevertheless, cultivation alone, no matter how thorough it might be, would not be sufficient to secure big crops. Fortunately, a good deal of field experimental work had been carried out in connection with this question of the value of Superphosphate for wheat crops, and the following figures were the averages of the results secured at 17 wheat-growing districts in South Australia, the period being up to the 1928-29 crop, and varying from one season at Cortlinye, Coorabie, and Copeville to 22 at Roseworthy Agricultural College, the total number of experimental series harvested during the period being 112:—

#### *Superphosphate for Wheat Crops.*

17 districts—112 crop-years.

|                    |       |                               | Value of Increase after<br>deducting Cost of Manure.* |                   |                   |                   |
|--------------------|-------|-------------------------------|-------------------------------------------------------|-------------------|-------------------|-------------------|
| Yield<br>per Acre. |       | Increase<br>due to<br>Manure. | Wheat.<br>at 2/-.                                     | Wheat.<br>at 2/6. | Wheat.<br>at 3/-. | Wheat.<br>at 3/6. |
| Bush.              | lbs.  | Bush. lbs.                    |                                                       |                   |                   |                   |
| No manure . . .    | 11 49 | —                             | —                                                     | —                 | —                 | —                 |
| ½cwt. . . . .      | 16 31 | 4 42                          | 6/11                                                  | 9/3               | 11/7              | 13/11             |
| 1cwt. . . . .      | 18 0  | 6 11                          | 7/4                                                   | 10/5              | 13/7              | 16/8              |
| 2cwt. . . . .      | 19 16 | 7 27                          | 4/11                                                  | 8/7               | 12/4              | 16/1              |

\* Superphosphate valued at 5s. per cwt.

These figures show that even at the extremely low prices of 2s. and 2s. 6d. per bushel for wheat the application of up to 1cwt. of Superphosphate per acre was a highly remunerative business proposition.

Without Superphosphate, Mr. Spafford added, it was impossible to produce full wheat crops in South Australia, and all those who could possibly finance it should continue the practice, even though a lesser amount be used than was the case when prices for wheat were higher than they promise to be in the near future.



**Botulism in Horses.**

A case of botulism in horses, assumed to be caused by feeding on ensilage, was recently investigated by veterinary officers of the Stock and Brands Department. Five horses had been accidentally given access to ensilage which was about 18 months old, and on the following day one died, followed by the deaths of the remaining four a week later. The ensilage had apparently caused the deaths of rabbits and hares, but not of sheep which had been fed similarly.

The owner of the horses stated that the silage appeared to be of good quality and free from mould. It had been made in pits and a very heavy weight of earth placed upon it. When the pit was opened the top layer had been removed and not fed to any stock. The symptoms of the affected horses were paralysis of the tongue in some cases, and others were down and could not get up.

Although it was known that another farmer fed his horses on silage from a pit silo (with earth sides) at the rate of about 12lbs. per day during the summer months without noting any ill effects, the veterinary officers were of opinion that owing to the danger of ensilage in the making being liable to damage by fermentation, mould, &c., on broad principles it was not advisable to recommend it as a food for horses, which were not so tolerant to damaged fodder as sheep and cattle. In commenting on the reason why the ensilage became infected with the *bacilli* which causes botulism, Dr. Lionel B. Bull (Director, Laboratory, Adelaide Hospital) stated that while the *bacilli* was an inhabitant of the soil it was not at all likely that ensilage in pits would more commonly become infected than that in concrete silos, as the plant itself probably contained the spores (on surface of leaves) before being placed in the pit. Although it was possible that the *bacilli* might grow out from the sides of the pit into the ensilage, for the most part the sides of the pit would be below the area of maximum bacterial growth in the soil. The frequency of occurrence of botulism in horses fed on hay recently cut from stacks was sufficient to indicate that the growth of the *bacilli* might occur under conditions far removed from those found in pit silos. It was not certain, although it seemed probable, that ensilage was more frequently infected with the *bacilli* than other stored forage. More care in feeding ensilage to stock might be observed, and where horses, particularly, had to be fed the ensilage should be exposed to the air for three or four days before it was used. Where the greatest care was necessary the ensilage could be sprayed with chlorine water made from bleaching powder and left exposed for 48 hours to allow the chlorine to escape and oxidation of the toxin to occur.

**Demand for Empire Butter.**

The Trades Commissioner, in a report dated December 17th, 1930, writes as follows:—"The following extracts are from a report entitled 'The Demand for Empire Butter' recently issued by the Empire Marketing Board:—Imports of butter into the United Kingdom during 1929 totalled 6,500,000cwts., or, in terms of boxes, 13,000,000 boxes. Home supplies based on latest figures available were approximately less than 1,000,000cwts. The largest exporter to this country was Denmark, who supplied 34 per cent. of the total import; New Zealand supplies were 20 per cent.; Australian, 12 per cent.; Irish Free State, 9 per cent.; Argentine, 5 per cent.; other foreign countries, 19 per cent. The main channels through which butter is imported into the United Kingdom are:—Australian—Mainly through London, with smaller quantities passing through Liverpool and Glasgow markets. New Zealand—Mainly through London, with Glasgow, Liverpool, and Bristol handling smaller supplies. Irish—Through ports on West Coast. Danish—Imported through ports on the East Coast. Russian, Argentine, and other European—London, Southampton, Hull, Newcastle, and Edinburgh. The report states that the most notable development in the import trade was the rapid



expansion of exports to his country from New Zealand. Australian supplies have also increased considerably; and South Africa, too, has begun to export, 12,000cwts. being received in 1929; but Canada has ceased to export butter to this country. Imports during 1929 were nearly 2,250,000cwts. above the average for the years 1909 to 1913, and, of this increase, 75 per cent. was accounted for by Empire butters and nearly 50 per cent. by New Zealand imports. The seasonal nature of the trade is emphasised by the fact that although supplies from Australia, New Zealand, Irish Free States, and Denmark are received throughout the year, in 1929 Australian supplies were heaviest during the months December-May; New Zealand, November-June; Irish Free States, June-October; while supplies from Denmark were fairly even throughout the year. The inquiry was made in two parts, late spring and during the summer months, and nearly 3,000 retail traders in 18 towns were interviewed. The result of the first survey (April-June) showed that Danish butter was stocked by 58 per cent. of the shops, and in the second survey (July-September) by 59 per cent. New Zealand, 35 per cent. in the first survey, but dropping to 28 per cent. in the second. Australian in the first survey was stocked by 10 per cent., but dropped to 3 per cent. in the second survey. Irish jumped from 12 per cent. in the first to 22 per cent. in the second survey. Argentine showed 4 per cent. in both surveys. Bulk blended butters, 9 per cent. in each survey; and packed butter, 32 per cent. in the first and 31 per cent. in the second survey. New Zealand butter, it is reported, was most frequently stocked in the south and early in the year in Liverpool. In Yorkshire and Scotland it was fairly frequent in non-local multiples, but rare in other shops. Australian butter was most popular in London and Birmingham, but rarely stocked in the north and east. It was most frequently found in non-local multiple shops and in co-operative stores. The main market for Irish was in the west, and it was also stocked in London and Glasgow. The staple butter in the north and east was Danish, and in Liverpool and Birmingham the demand was about the same as for Empire butters, but in London, Bristol, and South Wales it was much less commonly found. Argentine was chiefly stocked in London and Birmingham; Siberian in Birmingham and Bristol; Swedish and Finnish in the north; Ukrainian was stocked by one large multiple firm in all parts of the country; Dutch and French mainly stocked in London. Packet butters under a brand name were the staple type in dairies, and were stocked by about 30 per cent. of the grocers in addition. This type was most popular in London and Edinburgh.

#### **Publications Received.**

"Australian Dairyman's Handbook."—Published by Mr. Ralph S. Maynard, of Queensland. The "Australian Dairyman's Handbook," says Mr. H. B. Barlow (Chief Dairy Instructor) fills a long felt want for those engaged in the dairying industry in Australia. It is the most complete manual on dairying that has been published for Australian conditions. The subject matter on the management of dairy cows, including the feeding of stock and growing of crops, is all that could be desired. The importance of pigs as an adjunct to dairy farming has not been overlooked, and this aspect of the industry has not received the consideration in the past to which it is entitled. A feature of the book is the excellent numerous illustrations. These include examples of the various breeds which can be used as ideal types for dairymen throughout Australia. Undoubtedly this book should be in the hands of all dairymen who have the welfare of the industry at heart. Mr. Maynard has presented an ideal which every dairyman should strive to attain. The book is priced £2 5s., and can be obtained from Messrs. Angus and Robertson, Sydney, New South Wales, and local booksellers.

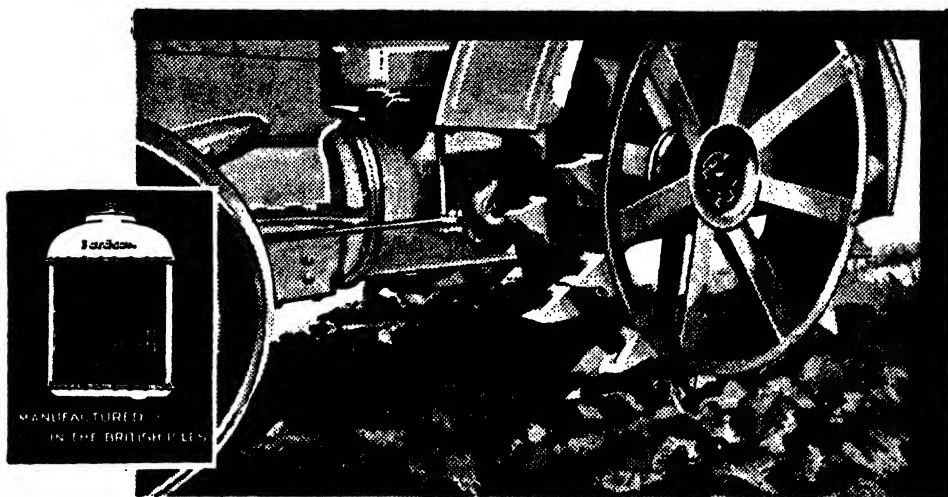
"Official Year Book of the Commonwealth of Australia," No. 23, 1930.

"The Demand for Empire Butter."—Empire Marketing Board Report, No. 34; 1s. net.

"New Zealand Romney Marsh Flock Book, 1929."

"The Shell Manual for Power Farmers."





## The Fordson's Outstanding Performance

**THAT** the new Fordson Tractor will do an eight-horse job—and more—in half the time and at a fraction the cost of horses, is being proved by progressive farmers all over Australia. And never were time and money more valuable than in these days of insistent clamour to “reduce farm production costs.”

The following extracts from letters recently received from owners of the New Fordson are surely proof enough of Fordson superiority over horse-team work.

*“Using a fifteen-hoe I.H.C. Combine we have ‘combined’ 180 acres with a kerosene consumption of 2½ acres to the gallon. Using a 10-disc Sundercut in fair ground we worked 50 acres on 32 gallons of kerosene. On these operations the throttle was opened only one third, yet the work would be a 9-horse job. The oil consumption is one quart per day.”*

\*. . . . . Yameena, Forbes, N.S.W.

*“The new Fordson pulled a 17-tine scarifier on leigh ground at a depth of from 8 to 10 inches. On stubble ground it pulled a 17-hoe Combine and Harrows; this was done on ½ throttle, and is an 8-horse job.”*

\*. . . . . Goombar, N.S.W.

If further proof is required, your nearest Ford dealer will give you facts and figures on your own field work. See him.

\*(Name and Address of Owner on request)

## The New Fordson Tractor

FORD MOTOR COMPANY OF

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AUSTRALIA PTY. LTD.





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**AGRICULTURAL INQUIRIES.**

---

[Reply by Prof. A. J. PERKINS, Director of Agriculture.]

---

**Ensilage.**

"R. G.," Swan Reach, asks—(1) Is it necessary to "mason" the sides of a pit silo? (2) Must the silo be kept airtight? (3) Can green lucerne be carted into the silo? (4) Can one mix with lucerne silver beet, barley, oats, &c., and yet make good ensilage? Replies (1) If the soil is of a stiff clay nature there is no reason why it should not prove suitable for an ensilage pit. The only difficulty is, however, that to get the best results out of ensilage there ought to be a definite relationship between the diameter of the pit and its height, thus, roughly speaking, a 100-ton ensilage pit should be about 30ft. high, with a diameter of 15ft.; a 50-ton 24ft. high, with a diameter of 12ft. In the circumstances it would probably be difficult to get a sufficient depth of suitable soil for your purpose.

(2) When the pit is being filled up one should aim at making it airtight as much as possible on the sides by tramping the green material down near the sides. The main advantage of this is that if air gets between the wall and the ensilage the outer edges are apt to become mouldy, and when subsequently the ensilage is fed to cattle the mouldy portions, unless carefully separated, would lead to digestive troubles and other disadvantages. The same applies to the top of the pit. The top of the pit will tend to become mouldy if left exposed to the air for any length of time. That is why, when taking out ensilage from a pit, it is advisable to take as shallow a layer as possible so as to remove the whole of the surface in one day.

(3) Do not allow the green material intended for ensilage to dry out to any extent. In other words, do not cut more greenstuff than you can cart in the same day. Otherwise there may be difficulty in getting a suitable rising temperature, and the ensilage will not pack well.

(4) Any good mixture may be made for ensilage purposes. As a matter of fact, lucerne alone does not make the best ensilage, and it is preferable to associate with it green barley, oats, &c.

---

[Replies by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

---

**Lucerne Growing.**

From a correspondent at Coomandook. (1) What would be a fair yield per acre from a fairly good stand of lucerne on Jervois (River Murray)? Reply—The yield of seed of the lucerne crop is probably more affected by the weather than almost any other of our cultivated crops, and this is so much so that one decent rain will often convert a promising seed crop into a poor hay crop. Given good weather, however, a fair yield of seed would be about 200lbs. to 300lbs. per acre; in some conditions more could be expected, but the yield would then be looked upon as a good one. (2) Owing to the presence of water within 2ft. or 3ft. of the surface, will the seed mature properly on the swamp when plants are left for seed. Reply—The presence of the underground water so near the surface is not an advantage for seed production, as it will lead to too much growth, but if no rain falls during the development of the crop its effect is most likely to be delayed ripening and difficulty in harvesting because of the luxuriance of the growth. (3) The plot was planted in August and all of it has been cut once and some of it twice. Can it be cut, say, twice more and then left for seed, or when is the best time to allow it to go to seed and when should it be harvested? Reply—Seed is usually taken from older stands of lucerne, but if weather



conditions remain favorable you may get a crop from this young stand. There is no chance of getting seed, however, if another hay cut is taken, because there will not be time for the seed to mature properly before the cold weather comes. The seed would be harvested during March. (4) After harvesting for seed, would the plant be destroyed or will it shoot from the roots again? Reply—The production of a crop of seed does not injure the stand nor the individual plants in any way. (5) What machinery is generally used for harvesting lucerne seed? Reply—In the north of the State, where so much good seed is collected, reaper-threshers with specially constructed fronts are used to harvest the seed direct, or strippers collect the pods and the unthreshed ones are repeatedly passed through the drum of a stripper being pulled along or blocked up and driven by an engine. In the latter case the cleaning is done with an ordinary winnower.

#### Sheep Grazing off Cape Barley and Oats.

“F. H. B.,” Paskeville, reports that he has a 70-acre field sown with Cape barley and oats. Although this has been fed down continuously there still remains a considerable quantity of surplus feed which presents a rather difficult problem. The crop should yield 6 bush. to 8 bush. to the acre. Would it be safe to allow a flock of ewes and wethers to graze off the crop. Reply—No difficulty should be experienced with the animals in a mixed flock of sheep from the grain still left on the crop, provided that some time is permitted the sheep to become used to the feed. The first day that the flock is turned into the field, the sheep should be full and should not be allowed to remain for more than an hour or so. The next day the time can be extended and so on each day for five or six days before leaving the flock full time.

#### Mustard (Charlock) as a Commercial Proposition.

“F. H. M.,” reports that he has 100lbs. of mustard (charlock) seed for sale and asks if it is of any commercial value. Reply—The department has no record of anyone growing either hedge mustard (*Sisymbrium officinale*) or wild mustard (*Sisymbrium orientale*). Although the plants are sometimes eaten by farm livestock they cannot be looked upon as good feed, and so can hardly be recommended for this purpose, particularly as they are such troublesome weeds where cereal crops are grown.

#### Fertilisation of the Wheat Plant.

At what stage in the formation of a wheat plant do the grains likely to mature actually set? (Blackheath Branch.) Reply—The organs of reproduction of the wheat plant consisted of:—(a) An ovary (that eventually developed into a grain), on the top of which were two feather-like appendages known as stigmas, as the female organs; (b) three pollen sacs, known as anthers, as the male organs. These female and male organs were enclosed between two scales or glumes, usually known by farmers as the chaff, and the whole was known as a floret. Three to five of those florets were grouped together and were known as spikelet. Several spikelets were fixed alternatively on opposite sides of a stalk, to form what was known as a head or ear of wheat. As soon as the floret of a wheat head had flowered, i.e., as soon as the pollen had matured and been scattered over the feathery stigmas at the top of the ovary, fertilisation of the ovary took place, or, in other words, the grain had “set.” If favorable conditions followed fertilisation, all ovaries fertilised would develop into grains, but if extreme changes in the weather occurred, or diseases such as “take-all” or “red rust” were present, some of the fertilised ovaries might not develop properly.

#### Red Rust in Wheat.

What is the cause of red rust in wheat and its effect on grain? (Blackheath Branch.) Reply—Red rust is a fungus which lives on the wheat plant and obtains all its sustenance from its host. The reddish powder found on the surface of the leaves and



sheaths, if examined under a microscope, will be seen to consist more or less of oval cells on short stalks. When weather conditions are favorable, i.e., "muggy" weather, the spores germinate by sending out thin threads which enter the breathing spores, grow into the wheat plant, and reproduce themselves by thousands in a few days. This very rapid multiplication of the rust plants eventually leads to the killing of the affected wheat plant, because the sap which should have travelled to the wheat heads to develop the grain is all intercepted by the rust plants. In mild attacks, the grain is usually "pinched" because insufficient sap reaches the heads to allow of full development, but in severe attacks, when the spores reproduce themselves by thousands every few days, the parasite uses all of the sap of the host plants.

#### **Best Time to Work Fallow.**

What is the best time to work fallow? (Palabie Branch). Reply—The correct time to work fallowed land varies with the soil texture. Heavy textured land which sets readily should be ploughed about 3in. deep, allowed to stand throughout the winter, receive its first cultivation in the early spring (usually in September in this State), and be cultivated or harrowed every time sufficient rain falls to form a crust on the surface and when weeds that sheep will not eat are in evidence. Light textured land, such as sandy loams and soils very rich in lime, should be ploughed or cultivated to a depth of 2in. to 3in. early in the season, say, before the end of July, and be harrowed immediately, and, as with other soils, cultivated or harrowed every time that a crust forms on the surface and when weeds that sheep will not eat are in evidence. Sandy soils should only be worked back soon after a rain when sufficiently moist to hold together, and even then the surface should be left as rough as possible.

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[Replies by Mr. R. C. SCOTT, Supervisor of Experimental Work.]

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#### **Pacey's Rye Grass.**

From time to time reports have been received regarding a rye grass known as Pacey's, which has been planted in certain areas in this State. It is therefore of interest to publish the following reference made by C. V. Piper in his book, "Forage Plants and their Culture." Dealing with rye grass varieties, he says:—"Apparently this grass is little subject to cross-pollination, and hence varieties are not difficult to maintain. Sinclair in 1825 mentions six different named varieties in England, and intimates that others were known to him. At the present time English seedsmen advertise several varieties of rye grass, but in some instances these 'varieties' are merely seeds of different weights or sizes separated by machinery. The seed is recleaned and graded according to weight and size. The small seeds are sold as short-seeded rye grass or sometimes as Pacey's Rye Grass." From the above it would appear that seed being sold under this name as a distinct variety, and for which special advantages are claimed, is simply a grade of seed separated from Perennial or English Rye Grass.

#### **Tobacco Cultivation.**

For growing tobacco—(1) What type of soil is necessary? (2) At what time of the year does it grow? (3) What rainfall is needed? (4) Where may plants or seeds be obtained? (5) What is the highest production in Australia? ("L. C. B.," Wirrulla.) Replies—(1) Tobacco grows in a great variety of soils, but for the production of the bright leaf required to-day, and which commands the highest prices, a sand overlying a good clay at a depth of from 9in. to 1ft. is essential. All tobacco land must be well drained. Heavier, more fertile soils produce more leaf, but as it is of a coarser texture the price is correspondingly lower. (2) In South Australia the seed is planted in seed beds during September or early October. In about two months' time the seed-



lings are ready for putting out in the field. The transplanting season is, therefore, November and December. With normal summer weather the leaves would be ready for harvesting in March or April. (3) For leaf of the best quality, the soil should be kept moist during the growing period of the crop. A wet soil injures quality and causes sickly growth. Therefore, whilst exceptionally high summer rainfall is not required, the amount which does fall should be regularly distributed. The chief tobacco growing countries receive at least an inch per week, and in well drained situations considerably more. In no place in South Australia have we adequate summer rainfall for maximum returns, and frequently it is not well distributed. (4) Seed is procurable from the Department at a price of approximately 4s. per ounce. With good germination an ounce of seed will supply plants for about six to seven acres. At times growers have a surplus of plants which can be purchased at a charge of about £1 per thousand. No growers are dealing entirely in seedlings, and their availability depends entirely upon circumstances. (5) No figures are available regarding the maximum yield in Australia. In any case, heavy yielding tobacco is of coarser texture and poorer quality. In a general way light soils producing fine textured leaf of maximum value per pound yield up to about 900lbs. of cured leaf per acre. Richer land growing heavier pipe leaf is capable of yielding up to 1,500lbs. cured leaf per acre.

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### DAIRYING INQUIRIES.

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[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor].

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#### Food for Dairy Cows.

In a recent communication on the use of concentrates—especially those rich in protein—as an adjunct to the food for dairy cows, Mr. H. B. Barlow (Chief Dairy Instructor) stated that the dairy division of the Department of Agriculture, in conformity with all similar departments throughout the world, was continually advocating the use of concentrates to obtain the best results from dairy cows. Officers were always strongly urging dairy farmers to consider the economic value of supplementing the cow's diet, during the season when rich succulent pastures were not available, with some food or foods of high protein value, to enable the cows to maintain their production. Since most of our locally grown concentrates (cereal, grains, &c.) contained rather a high percentage of carbo-hydrates, the addition of a foodstuff with higher protein content to balance the ration would definitely have a beneficial effect. He was quite certain that any dairyman who fed well-balanced concentrates to his cows could confidently expect much improved returns, and if the feeding was carried out systematically and intelligently the results should prove highly economical.

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### VETERINARY INQUIRIES.

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[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

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“A. I. D.,” Keith, reports cases of lameness in horses, and asks how the seat of the trouble can be located.

Reply—In cases of lameness below the knee, the animal always nods the head, in moving the dipping of the head synchronising with the time the weight is put on the lame foot. If nodding occurs, the affected leg should be carefully examined by passing



the hand down the back of the leg from the knee downwards and applying a firm pressure to the tendon sheathes. In this way any swelling, heat, or pain can be established. The foot should be picked up and searched for presence of nails, stakes, etc., and hoof tested by applying pressure with a wide pair of pincers to the junction of hoof and sole, commencing at one heel and working round the hoof to the other heel, and completely tapping the sole with a hammer. If animal flinches when pressure is applied by pincers or hammer, the spot should be searched for cracks by using a rasp or hoof knife and any cracks followed through to the bottom. In the case of hind limb lameness, the animal will drop on the affected leg when weight is put on it, and same procedure for determining the seat of the trouble as given for examining fore limbs should be applied. The common causes of lameness are strain of tendons and their sheathes, strain of suspensory ligament, which is under the tendons, ricks and sprains of joints, presence of wounds such as cracked heels, bark wire cuts, and foreign bodies in the sole.

"E. M.," Meribah, reports horses troubled with water stoppage. *Post mortem* of the animal showed intestines twisted and the large cavity filled with blood. Other horses have tucked up appearance and will not move.

Reply—The trouble with the horses is not difficulty in passing water so much as bowel impaction, and it is useless—and possibly may even be harmful—to go on trying to put in to them all sorts of drastic medicines to unnecessarily stimulate the kidneys. If you take the care to see that the animals regularly get liberal supplies of drinking water, you will find that they will soon come free enough again in their "water." Give them each a drench of raw linseed oil, 1½ pints; turpentine, 4 tablespoonfuls; and repeat the drench of oil by itself in 24 hours' time. Supplement these drenches by giving an enema of soapy water night and morning for a few days. Mix this in a spoonful of treacle or honey to make a paste and smear it on their tongues and back teeth so that it sticks there and they have to lick it down. Continue this treatment until you succeed in establishing free action of the bowels. Feed them on wet bran with a little good-quality chaff mixed, and after the bowels are working well again the proportion of chaff can be increased. It is no wonder that the horses you blistered so lavishly are tender and up on their toes. In order to assist in their recovery from the ill-effects of this treatment, bathe the blistered legs daily in some warm antiseptic solution, and after washing, smear on a little lard or oil. Do not apply vaseline, or it will only intensify the effects of the blistering.

"J. C. H.," Springton, reports mare lame and with swelling between front legs and belly.

Reply—Give the following drench:—Raw linseed oil, 1½ pints; turpentine, 4 tablespoonfuls, and supplement by giving enemas of soapy water night and morning. Repeat the drench of oil by itself if necessary in 24 hours' time. Also give one flat teaspoonful of powdered nux vomica on the back of the tongue night and morning. Feed lightly on wet bran and chaff and see that the animal has plenty of water to drink. Subsequently to establishing through this treatment a free action of the bowels, feed on nourishing feed with an allowance of succulent feed in the ration daily if possible, and give one tablespoonful of Fowler's solution of arsenic night and morning in the damped feed for a fortnight. Knock it off for a fortnight and then repeat the course again. Regular massage of the oedematous swelling under the brisket will help to promote its absorption.

"E. W. S.," Wolseley, has cow with lump at the back of the jaw which breaks and discharges and then heals again. Reply—Apply hot fomentos to the swelling to induce it to form a head again. Then when it softens, lance it with a clean, sharp knife at its lower edge to permit of free drainage of pus. Keep the wound open so long as any discharge forms and syringe out the abscess cavity (once or



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twice daily) with a little tincture of iodine diluted with two parts of water. The condition is probably just a benign abscess but in view of the possibility that it may be actinomycosis, collect some of the pus (or discharge) into a small sterile bottle and forward same to the Stock and Brands Department, Flinders Street, Adelaide, for examination.

"R. W. C.," Minlaton, asks treatment for cut, caused by rusty galvanized iron, on mare's leg, and (2) cause of and cure for greasy heel. Replies—(1) The following treatment for the wound is advised. Rub the proud flesh all over with a piece of fresh bluestone. Apply a pad of cotton wool and bandage leg *tightly*. A strong calico bandage of a good length is required. Remove the bandage night and morning, *massage* the leg thoroughly, and replace the bandage. (2) The cause of "greasy heel" is obscure. The condition is a chronic inflammation of the skin. Treatment.—Clip the hair from the area and clean part by washing with soap and water containing a little washing soda. Dry thoroughly. Apply a pad of cotton wool soaked in a 5 per cent. solution of zinc chloride, which you will have to get from a chemist. Bandage. Do this daily for three or four days. Subsequently apply the following powder on cotton wool to area of bandage:—Salicylic acid one part, zinc oxide six parts. Further, the horse should be given a tablespoonful of Fowler's solution of arsenic mixed in a small damped feed night and morning for 10 days.

"W. G. A.," Tanunda, has cow, udder hard and swollen, milk lumpy and discolored. Reply—The cow is undoubtedly suffering from mammitis, and in view of the fact that the disease is now of some weeks standing, it is very doubtful if a satisfactory recovery can be brought about by treatment. If there be any heat and tenderness in the affected quarter, hot fomentations should be applied three or four times a day for 15 to 20 minutes at a time, each fomenting being followed up by massaging the quarter for two or three minutes, rubbing in some camphorated oil. The affected quarter should be "stripped" right out at frequent intervals, even though at each stripping you only get a small amount of milk. This stripping is most important, and if you can carry it out as often as every hour or two, then so much the better the chances of ultimate recovery. This treatment should be persisted in until the milk returns to normal character. Destroy all diseased milk. Do not attempt any injections into the affected quarter. The cow should also be given a purgative drench of Epsom salts, 1lb.; molasses, 1lb.; ginger, 2ozs.; water, 1 quart at outset of treatment and kept on light laxative diet throughout.

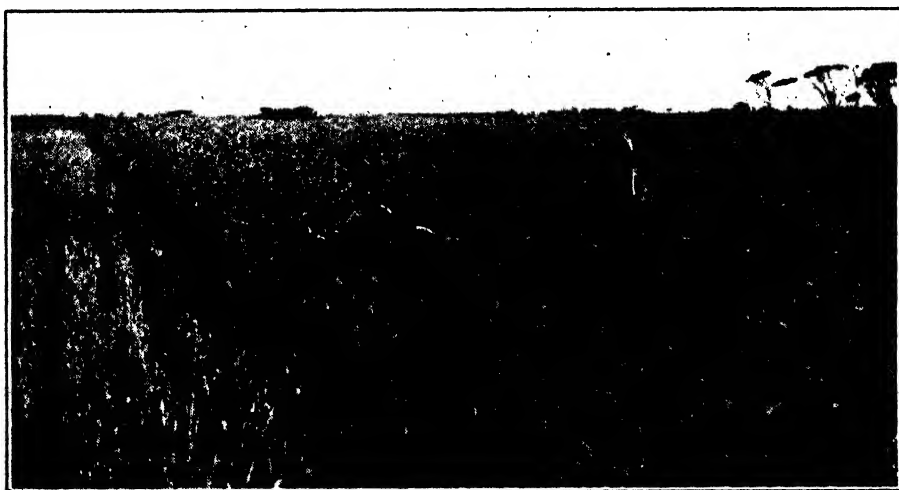
"V. E. W.," Millendilla, asks treatment for dog with mange. Reply—The following treatment is suggested:—Wash area with warm water and a good soap, and remove all scales. Apply zinc oxide ointment daily. Re-wash every fourth day. Put dog on to a light diet and regulate bowels by giving a tablespoonful of liquid paraffin daily. Avoid starchy foods. Give regular exercise.

"E. C. R.," Wepowie, reports death of aged gelding. During lunch hour blood noticed dripping with a gush every five or six minutes; this continued throughout the day. Next morning blood was still dripping with gushes every 15 minutes. The horse then went down and did not rise again. Reply—The case was apparently just one of nasal haemorrhage. This accident may arise from several causes. Most commonly it results from injuries to the nose, but disease of the nasal septum or even severe exertion may give rise to it. Usually the bleeding occurs from one nostril only, though bilateral bleeding is not by any means uncommon and is usually more serious, even being fatal. Treatment consists of keeping the animal quiet with head elevated, but not sufficiently to cause the blood to run to the back of the throat. Cold water should be applied to the head, and the nostrils syringed out gently with cold water, to which tannic acid or vinegar is added. Insufflation of finely powdered alum may be tried where the haemorrhage comes from the lower portions of the nostrils. In severe cases plugging of the nostrils or the injection of adrenalin may be necessary, but these treatments require skilled help.



"W. S. K.," Virginia asks reason for appearance of warts on teats of cow and remedy for same. Reply—Warts are generally believed to be due to some irritation of the skin. Whether this irritation is of bacterial origin or not has not been determined. Some authorities ascribe them to a definite infective origin. They will disappear spontaneously if the teats are kept clean and free from irritating conditions. The rubbing on of castor or olive oil after each milking will often cause them to disappear. The application of salicylic ointment or lunar caustic is also serviceable if the warts are flat. Pedunculated warts can be snipped off at their base with a sharp pair of scissors and the stump touched up with a lunar caustic pencil, but care must be taken to prevent the caustic from getting on to the adjacent healthy skin.

"S. W. S.," Kimba, reports death of horse. Working in reaper, broke out in severe sweat unable to rise off ground. Another horse with the same symptoms died shortly afterwards. Reply—The horses appear to have died from forage poisoning. This ailment is contracted through eating fodder which has become contaminated with the poisonous toxin of the germ known as the *Bacillus botulinus*. It is a disease essentially similar to ptomaine poisoning of human beings. The botulinus germ is a common inhabitant of the soil in many districts throughout the State, and thus it readily gains access to the fodder grown thereon. The germ is not harmful of itself, but under certain conditions favorable to its rapid growth on the fodder it will, while actively growing, produce a powerful poison, or toxin, which is responsible for causing illness and death in horses when taken in by them along with the feed. Do you recollect whether you experienced any showery weather during harvesting so that the sheaves might have been damp when stacked? Treatment of affected animals is not usually hopeful, and, even if they do not die, it is usually some months before they are fit for work again. They should be put in slings (the earlier the better), given a good purgative dose of Epsom salts and a course of powdered nux vomica—one flat teaspoonful three times a day for some days. Feed should consist of bran mash and green fodder.



Crop of Sword (Early Midseason) wheat grown by R. N. Ford and Sons, Windsor. Yield, nine bags per acre; weight per bushel, 63½ lbs. Sown at the rate of 75 lbs. graded seed and 115 lbs. of 45% super per acre.



## SEED FROM CROP COMPETITIONS.

The following competitors in Crop Competitions have exhibited crops which, in the opinion of judges, will produce grain suitable for seed purposes:—

### WHEATS.

Competition. Competitor. Address. Variety.

#### RUSSELL AND BUCCLEUCH—

A. J. Walker, Perponda—Felix.  
H. Sanders, Karoonda—Nabawa, Caliph.

#### ALFRED—

G. E. Hyde, Paruna—Merriden.  
F. A. Hondow, Paruna—Free Gallipoli.  
A. E. Reichstein, Paruna—Nabawa.  
A. C. Webb, Paruna—Ford.  
A. A. Patterson, Paruna—Sultan.  
C. Wareing, Paruna—Nabawa.  
A. G. Petch, Meribah—Late Gluyas.  
A. A. Marsh, Meribah—Felix.  
A. R. Birch, Nangari—Gluyas, Nabawa.  
J. C. Auricht, Taldra—Gluyas, Late Gluyas, Caliph, South African.  
A. W. Traeger, Loxton—Sultan.

#### ALBERT—

W. H. Todd, Caliph—Bald Early.  
T. C. Stott, Mindarie—Bald Early.  
P. J. W. Clonan, Halidon—Free Gallipoli.  
C. H. Russell, Halidon—Ranee.  
G. H. Sutherland, Copeville—Sepoy, Sultan, Free Gallipoli.  
A. E. Carslake, Kunlara—Sultan.

#### NORTHERN YORKE PENINSULA—

T. H. Trengove, Bute—Waratah.  
E. W. Clasohm, Artherton—Ford.  
H. E. Aldenhoven, Artherton—Sepoy.  
M. Yelland, Kadina—Waratah.  
H. Rodda, Thrington—Free Gallipoli.  
T. Rodda, Thrington—Nabawa.  
C. Rodda, Thrington—Nabawa.  
E. Yelland, Thrington—Faun.

#### JERVOIS—

A. Spriggs, Cleve—Gluyas.  
C. McCallum, Rudall—Gluyas.  
D. McCallum, Rudall—Sultan.  
G. H. Branden, Rudall—Nabawa.  
E. H. Pearce, Rudall—Gluyas.  
W. F. Lake, Rudall—Nabawa.  
F. Hauschild & Sons, Cleve—Bena.

#### LE HUNTE—

J. G. Spiers, Wudinna—Caliph.

#### CHANDOS—

E. E. Meagher, Murrayville—Free Gallipoli.  
C. and L. Fischer, Pinnaroo—Begum, Free Gallipoli.  
E. Neindorf, Parilla—Caliph.  
C. E. Moyle, Parilla—Sultan.



Competition. Competitor. Address. Variety.

CHANDOS—*continued.*

J. H. and C. H. Spratt, Lameroo—Sultan, Waratah, Felix.  
 C. L. Spratt, Lameroo—Waratah.  
 A. J. A. Koch, Lameroo—Sultan, Gluyas.  
 C. E. Koch, Lameroo—Sultan.  
 R. C. Jacob, Geranium—Free Gallipoli.  
 Hardy Bros., Jabuk—King's Early.  
 W. E. Beelitz, Jabuk—Nabawa, Sultan.

BUXTON—

N. B. Hancock, Kimba—Faun.

SOUTHERN—

E. W. Woolfit, Strathalbyn—Sultan.  
 Thomas Bros., Monarto South—Nabawa.  
 C. F. Altmann, Monarto South—Leatherhead.  
 C. Brooks, Woodchester—Nugget.  
 W. Birmingham, Woodchester—Caliph.  
 C. A. Whittlesea, Langhorne's Creek—Nabawa.  
 Whittlesea Bros., Langhorne's Creek—Dan.  
 Pearson Bros., Brinkley—Dan, Nabawa.  
 H. D. and E. G. Humphrey, Brinkley—Nabawa.  
 A. B. Jaensch, Bletchley—Currawa.

MIDLANDS—

W. R. Woods & Sons, Mintaro—Bena, Federation.  
 A. E. Scarfe, Mintaro—Free Gallipoli.  
 J. Ross, Mintaro—Free Gallipoli, Sepoy.  
 R. W. Blatchford, Mintaro—Free Gallipoli.  
 A. L. Sandow, Mintaro—Wannon.  
 Keith Schunke, Manoora—Federation and Dan.  
 H. Schunke, Manoora—Free Gallipoli.  
 L. Thornby, Merilden—Free Gallipoli.  
 A. J. Melrose, Mintaro—Free Gallipoli.  
 J. S. Miller, Auburn—Federation and Nabawa.  
 A. R. Bagshaw, Saddleworth—Dan.  
 J. G. Rogers, Saddleworth—Dan and Nabawa.  
 Crawford Bros., Saddleworth—Waratah.  
 F. Coleman, Saddleworth—Free Gallipoli.  
 G. & C. Frost, Manoora—Free Gallipoli.  
 J. H. Torr, Farrell's Flat—Bena.  
 S. Garrard, Merilden—Free Gallipoli.  
 L. A. Martin, Farrell's Flat—Bena and Free Gallipoli.  
 R. H. Martin, Farrell's Flat—Bena.  
 A. E. Crossing, Farrell's Flat—Free Gallipoli.  
 G. Miller, Farrell's Flat—Bena.  
 Jas. Brereton, Hanson—Leak's Rust Proof.  
 W. J. Woilacott, Hanson—Nabawa, Clarence, and Leak's.  
 C. P. Turner, Hanson—Nabawa.  
 Jas. Dempsey, Farrell's Flat—Federation.  
 H. H. Davis & Sons, Riverton—Waratah.  
 A. L. Frost, Riverton—Waratah.  
 J. W. Kelly, Riverton—Waratah.  
 A. G. Bright, Clare—Free Gallipoli.  
 V. M. Lally, Clare—Free Gallipoli.  
 W. S. McAuliffe, Buchanan—Nabawa.  
 W. Armstrong, Buchanan—Free Gallipoli.  
 L. V. Bell, Marrabel—Federation.  
 B. & N. Hughes, Kapunda—Onas and Sultan.  
 G. Hazel, Kapunda—Wannon and Nugget.  
 W. S. Kelly, Tarlee—Sultan, Currawa, and Sepoy.  
 Molineaux Bros., Tarlee—Free Gallipoli.  
 Clayton Dunn, Black Springs—Nizam.



Competition. Competitor. Address. Variety.

**MID-YORKE PENINSULA—**

B. W. Vandeppeer, Petersville—Sultan, Nabawa.  
Henderson Bros., Maitland—Ford.  
A. R. Vandeppeer, Petersville—Nabawa.

**SOUTHERN YORKE PENINSULA—**

G. S. Brundell, Stansbury—Ranee, Nabawa.

**NORTHERN—**

W. F. Wurst, Laura, Nabawa.  
J. C. Kleinig, Laura—Sultan.  
V. Walter, Laura—Nabawa.  
J. W. Prior, Gladstone—Turvey.  
W. M. Neate, Caltowie—Ghurka, Nabawa.  
E. J. Hughes, Laura—Waratah, Sultan.  
J. Cross, Caltowie—Sultan.  
J. E. Lehmann, Caltowie—Sepoy.  
E. J. Hollitt, Wirrabara—Currawa.

**WESTERN—**

F. T. Johns, Port Pirie—Currawa, Nabawa.  
L. C. Roberts, Port Pirie—Currawa.  
F. Jose, Nelshaby—Currawa.

**MID-NORTH—**

E. Smart, Gulnare—Ford.  
J. A. Lyons, Georgetown—Ford.  
Spencer Bros., Koolunga—Joffre.  
F. A. Gray, Rochester—Joffre.  
W. O. Eime, Blyth—Nabawa.  
F. J. Pedler, Koolunga—Golden Return.

**TATIARA—**

G. D. Butler, Wolseley—Nizam.  
D. R. Milne, Bordertown—Nizam.  
A. Ross, Mundalla—Bena.  
R. Hinge, Bordertown—Bena.  
H. C. M. Pilgrim, Wolseley—Federation.  
R. A. Grosser, Wolseley—Federation.  
E. W. Sharrad, Wolseley—Gallipoli.  
A. E. Milne & Son, Bordertown—Gallipoli.  
D. R. Milne, Bordertown—Gallipoli.  
E. L. Milne, Bordertown—Gallipoli.  
A. E. England, Bordertown—Gallipoli.  
C. England, Bordertown—Gallipoli.  
F. V. Trenorden, Bordertown—Gallipoli.  
\*Fisher Bros., Bordertown—Gallipoli.  
\*H. C. M. Pilgrim, Wolseley—Gallipoli.

**ROBINSON AND DUFFERIN—**

J. J. Murphy, Mortana—Late Gluyas.  
P. J. Murphy, Mortana—Late Gluyas.  
C. Holland, Courela—Late Gluyas.  
A. P. Kenny, Coolgranna—Late Gluyas.  
C. Montgomery, Chilpanunda—Late Gluyas.  
L. Speed, Nargultie—Late Gluyas.  
G. P. Roberts, Petina—Bena.

\* Specially recommended.

**OATS.**

**ALLANDALE—**

T. Earle, Allandale East—Algerian.  
W. M. Laslett, Allandale East—Algerian.  
W. G. H. Sporer, Glencoe West—Algerian.  
G. F. Ferguson, Glencoe West—Algerian.  
E. H. Kentish, Mount Gambier—Algerian.  
A. Buchanan, Mount Gambier—Algerian.





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### Golden Shell Oil

Ensures easier working, and prolongs the life of the tractor.

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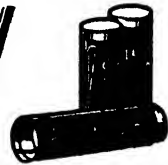
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# NINTH ANNUAL REPORT OF THE TURRETFIELD DEMONSTRATION FARM (1929-30), INCLUDING DE- TAILED ANALYSIS OF MEAN FARMING COSTS (1921-30).

[By ARTHUR J. PERKINS, Director of Agriculture.]

(Continued from page 599).

## WORKING COSTS OF A FAT LAMB FLOCK.

The Turretfield Flock has within recent years consisted of Merino Ewes from which Fat Lambs have been bred by Rams of English Short Wool Breeds. The number of Ewes put to the Rams in each successive season has been as follows:—

|               | Ewes.      |
|---------------|------------|
| 1922-23 ..... | 429        |
| 1923-24 ..... | 458        |
| 1924-25 ..... | 530        |
| 1925-26 ..... | 637        |
| 1926-27 ..... | 683        |
| 1927-28 ..... | 774        |
| 1928-29 ..... | 724        |
| 1929-30 ..... | 678        |
| 1922-30 ..... | <u>614</u> |

The position of opening and closing Inventories for 1929-30 is shown below in contrast with corresponding means for the 1922-29 and 1922-30 periods respectively:—

TABLE XXVI.—*Contrasting 1929-30 Opening and Closing Inventories with corresponding Means for 1922-29 and 1922-30 periods respectively.*

|               | 1929-30 Opening and Closing<br>Inventories. |          | 1922-29 Mean Inventories. |            | 1922-30 Mean Inventories. |           |
|---------------|---------------------------------------------|----------|---------------------------|------------|---------------------------|-----------|
|               | 1/4/29.                                     | 31/3/30. | Opening.                  | Closing.   | Opening.                  | Closing.  |
|               | NUMBERS.                                    |          |                           |            |                           |           |
| Rams .....    | 14                                          | 12       | 20                        | 18         | 19                        | 17        |
| Ewes .....    | 689                                         | 684      | 615                       | 650        | 624                       | 654       |
| Hoggets ..... | 175                                         | 126      | 62                        | 81         | 76                        | 87        |
| Rations ..... | —                                           | —        | 11                        | 9          | 10                        | 8         |
| Totals.....   | 878                                         | 822      | 708                       | 758        | 729                       | 766       |
|               | CORRESPONDING VALUES.                       |          |                           |            |                           |           |
|               | £ s. d.                                     | £ s. d.  | £ s. d.                   | £ s. d.    | £ s. d.                   | £ s. d.   |
| Rams .....    | 44 0 0                                      | 64 0 0   | 4 4 3                     | 48 2 10    | 46 16 3                   | 48 7 6    |
| Ewes .....    | 1,024 10 0                                  | 674 0 0  | 871 10 9                  | 968 5 9    | 890 13 1                  | 931 10 0  |
| Hoggets ..... | 175 0 0                                     | 94 10 0  | 60 11 5                   | 81 14 3    | 74 17 6                   | 83 6 3    |
| Rations ..... | —                                           | —        | 11 8 7                    | 10 9 9     | 10 0 0                    | 9 3 6     |
| Totals.....   | 1,243 10 0                                  | 832 10 0 | 990 15 0                  | 1,106 12 7 | 1,022 6 10                | 1,072 7 3 |

It will be noted that the closing Inventory for 1929-30 Season shows a drop in values of £411, and in numbers of 56 only. This difference is due to the general fall in value of Sheep following on the fall in price of Wool. On the opening Inventory aggregate Ewes and Hoggets were valued at 27s. 9d. per head, and on the closing Inventory at 19s. per head. This drop has represented a heavy Loss on the year's transactions. On the eight seasons the Turretfield Flock has averaged, apart from Lambs, 748 head, having a mean value of £1,047 7s. 1d., or 28s. per head.



Flock Mortality for 1929-30 has been shown below in contrast with corresponding means for 1922-29 and 1922-30 periods respectively:—

|              | 1929-30.      |               | 1922-29.      |               | Means,        |               | 1922-30.      |               |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|              | Total Losses. | Percent-ages. | Total Losses. | Percent-ages. | Total Losses. | Percent-ages. | Total Losses. | Percent-ages. |
| Ewes .....   | 50            | 7.4           | 37            | 6.2           | 39            | 6.3           |               |               |
| Lambs .....  | 22            | 2.6           | 19            | 4.1           | 20            | 4.0           |               |               |
| Rams .....   | —             | —             | 1             | 14.5          | 1             | 13.3          |               |               |
| Totals ..... | 72            | 4.7           | 57            | 5.3           | 60            | 5.3           |               |               |

Mortality among Ewes, although less than in the preceding season—75 head—continued to be heavy in 1929-30, namely, 50 head, or 7.4 per cent. of the mean total number. The mean total mortality for the eight seasons was represented by 60 head, or 5.3 per cent. of the total Flock, inclusive of Rams and Lambs. Of recent years deaths have been attributable mainly to parturient fever and braxy-like disease.

Flock expenditure for 1929-30 has been analysed below in Table XXVII. for the 1922-29 and 1922-30 Means respectively:—

TABLE XXVII.—*Analysis of 1929-30 Flock Expenditure in comparison with corresponding means for 1922-29 and 1929-30 Periods respectively.*

|                                      | 1929-30.          |                   |  | 1922-29.          |                   |  | Means, 1922-30.   |                   |       | Percentage |
|--------------------------------------|-------------------|-------------------|--|-------------------|-------------------|--|-------------------|-------------------|-------|------------|
|                                      | Total.<br>£ s. d. | Per Ewe.<br>s. d. |  | Total.<br>£ s. d. | Per Ewe.<br>s. d. |  | Total.<br>£ s. d. | Per Ewe.<br>s. d. |       |            |
| Number of Ewes put to Rams .....     | 678               |                   |  | 605               |                   |  | 614               |                   |       |            |
| I. LABOR—                            | £ s. d.           | s. d.             |  | £ s. d.           | s. d.             |  | £ s. d.           | s. d.             | %     |            |
| 1. Ordinary .....                    | 116 8 3           | 3 5               |  | 103 8 10          | 3 5               |  | 105 1 3           | 3 5               | 13.3  |            |
| 2. Shearing .....                    | 42 13 5           | 1 3               |  | 34 2 0            | 1 2               |  | 35 3 5            | 1 2               | 4.4   |            |
| 3. Dipping .....                     | 1 16 2            | 0 1               |  | 3 3 3             | 0 1               |  | 2 19 11           | 0 1               | 0.4   |            |
| Totals.....                          | 160 17 10         | 4 9               |  | 140 14 1          | 4 8               |  | 143 4 7           | 4 8               | 18.1  |            |
| II. FEED—                            |                   |                   |  |                   |                   |  |                   |                   |       |            |
| 1. Ordinary Pasture .                | 379 11 4          | 11 2              |  | 275 12 4          | 9 1               |  | 288 12 3          | 5                 | 30.5  |            |
| 2. Sown Crops .....                  | 113 8 11          | 3 4               |  | 64 6 9            | 2 2               |  | 70 9 6            | 2 4               | 8.9   |            |
| 3. Foodstuffs .....                  | 239 17 2          | 7 1               |  | 42 17 0           | 1 5               |  | 67 10 0           | 2 2               | 8.5   |            |
| 4. Water .....                       | 7 9 10            | 0 3               |  | 7 4 5             | 0 3               |  | 7 5 1             | 0 5               | 0.9   |            |
| Totals.....                          | 740 7 3           | 21 10             |  | 390 1 0           | 12 11             |  | 433 16 10         | 14 2              | 54.8  |            |
| III. INCIDENTALS—                    |                   |                   |  |                   |                   |  |                   |                   |       |            |
| 1. Dip, packs, &c. .                 | 11 10 8           | 0 4               |  | 9 14 0            | 0 4               |  | 9 18 7            | 0 4               | 1.2   |            |
| 2. Use of Horses .                   | 11 13 7           | 0 4               |  | 10 16 0           | 0 4               |  | 10 15 0           | 0 4               | 1.4   |            |
| 3. Use of Implements                 | 10 7 1            | 0 4               |  | 9 4 7             | 0 4               |  | 9 7 6             | 0 4               | 1.2   |            |
| 4. Freight on Lambs and Wool .....   | 42 3 2            | 1 3               |  | 17 11 8           | 0 7               |  | 20 13 1           | 0 8               | 2.6   |            |
| 5. Rates and Taxes .                 | 28 14 0           | 0 10              |  | 20 0 0            | 0 8               |  | 21 1 10           | 0 8               | 2.7   |            |
| 6. Interest on Working Capital ..... | 70 10 9           | 2 1               |  | 45 19 2           | 1 6               |  | 49 0 7            | 1 7               | 6.2   |            |
| 7. Unallotted Expenditure .....      | 163 2 8           | 4 10              |  | 83 3 11           | 2 9               |  | 93 3 9            | 3 1               | 11.8  |            |
| Totals.....                          | 338 1 11          | 10 0              |  | 196 9 4           | 6 6               |  | 214 3 4           | 7 0               | 27.1  |            |
| Grand Totals .                       | 1,239 7 0         | 36 7              |  | 727 4 5           | 24 1              |  | 791 4 9           | 25 10             | 100.0 |            |

The above Statement shows that on the basis of the Mean Number of Ewes sent to the Rams in eight successive seasons, the mean costs of Handling a Fat Lamb Flock, inclusive of marketing Costs, have aggregated 25s. 10d. per Ewe. In these costs, 4s. 8d., or 18.1 per cent. has been absorbed by Wages; 14s. 2d., or 54.8 per cent. by Feed; and 7s., or 27.1 per cent., by Incidentals. It will be observed that in this statement no account has been taken of Flock Depreciation, which should include progressive depreciation of Breeding Ewes and Rams, and losses from deaths or accidents. This item is included in Inventory differences which appear in the statement of Flock Revenues. In next year's Report it is proposed to split up Inventory Differences, so as to bring out Flock Depreciation.



Under "Feed" four items have been included, namely:—(1) Pasture Grazing; (2) Specially sown Grazing Crops; (3) Foodstuffs; and (4) Water. The value of pasture grazing is determined by the rental value of the land over which the Flock is depastured, plus whatever improvements—such as top-dressing—that may have been carried out during the season. The value of specially sown grazing crops is determined by actual costs incurred in putting the crops in, inclusive of the rental value of the land. When Live Stock other than Sheep are admitted to pastures or grazing crops, their relative shares are apportioned on the basis of one Horse being equivalent to nine Sheep, and one Cow to seven Sheep.

In Table XXVIII. Flock Expenditure has been analysed in further detail:—

TABLE XXVIII.—*Detailed Analysis of Mean Yearly Costs of Fat Lamb Flock (1922-30).*

|                                         | Labor.    | Horses.  | Implements. | Material and<br>other Items. | For<br>614 Ewes. | Totals.<br>Per Ewe. | * Percent-<br>age. |
|-----------------------------------------|-----------|----------|-------------|------------------------------|------------------|---------------------|--------------------|
|                                         | £ s. d.   | £ s. d.  | £ s. d.     | £ s. d.                      | £ s. d.          | s. d.               | %                  |
| <b>A. Tending Flock—</b>                |           |          |             |                              |                  |                     |                    |
| 1. Tailing .....                        | 2 1 7     | 0 1 7    | 0 0 2       | —                            | 2 3 4            | 0 0 9               | 0.3                |
| 2. Dipping .....                        | 2 19 11   | 0 5 3    | 1 16 1      | 3 2 10                       | 8 4 1            | 0 3 2               | 1.0                |
| 3. Shearing .....                       | 35 3 5    | 0 1 0    | 0 4 8       | 6 9 0                        | 41 18 1          | 1 4 4               | 5.3                |
| 4. Various .....                        | 88 12 10  | 6 5 3    | 0 19 8      | —                            | 95 17 9          | 3 1 5               | 12.1               |
| Totals.....                             | 128 17 9  | 6 13 1   | 3 0 7       | 9 11 10                      | 148 3 3          | 4 10                | 18.7               |
| <b>B. Feed—</b>                         |           |          |             |                              |                  |                     |                    |
| 1. Ordinary Pasture ..                  | —         | —        | —           | 288 12 3                     | 288 12 3         | 9 5 0               | 36.5               |
| 2. Grazing Crops ...                    | —         | —        | —           | 70 9 6                       | 70 9 6           | 2 3 6               | 8.9                |
| 3. Handfeeding .....                    | 7 1 1     | 2 4 4    | 6 3 6       | 67 10 0                      | 82 18 11         | 2 8 5               | 10.5               |
| 4. Water .....                          | —         | —        | —           | 7 5 1                        | 7 5 1            | 0 2 8               | 0.9                |
| Totals.....                             | 7 1 1     | 2 4 4    | 6 3 6       | 433 16 10                    | 449 5 9          | 14 7 9              | 56.8               |
| <b>C. Marketing—</b>                    |           |          |             |                              |                  |                     |                    |
| 1. Wool .....                           | 1 11 10   | 0 16 3   | 0 2 0       | 3 8 10                       | 5 18 11          | 0 2 3               | 0.7                |
| 2. Sheep, Lambs, &c.                    | 5 13 11   | 1 4 4    | 0 1 5       | 17 4 3                       | 24 3 11          | 0 9 5               | 3.1                |
| Totals.....                             | 7 5 9     | 2 0 7    | 0 3 5       | 20 13 1                      | 30 2 10          | 0 11 8              | 3.8                |
| <b>D. INCIDENTALS—</b>                  |           |          |             |                              |                  |                     |                    |
| 1. Sundry Stores ...                    | —         | —        | —           | 0 6 9                        | 0 6 9            | 0 0 1               | —                  |
| 2. Rates and Taxes ..                   | —         | —        | —           | 21 1 10                      | 21 1 10          | 0 8 3               | 2.7                |
| 3. Interest on Working<br>Capital ..... | —         | —        | —           | 49 0 7                       | 49 0 7           | 1 7 2               | 6.2                |
| 4. Unallotted Expen-<br>diture .....    | —         | —        | —           | 93 3 9                       | 93 3 9           | 3 0 5               | 11.8               |
| Totals.....                             | —         | —        | —           | 163 12 11                    | 163 12 11        | 5 4 1               | 20.7               |
| Grand Totals ...                        | 143 4 7   | 10 18 0  | 9 7 6       | 627 14 8                     | 791 4 9          | 25 10               | 100.0              |
| Per Ewe .....                           | 0 4 8     | 0 0 4    | 0 0 4       | 1 0 6                        | 1 5 10           | —                   | —                  |
| Percentages .....                       | %<br>18.1 | %<br>1.4 | %<br>1.2    | %<br>79.3                    | %<br>100.0       |                     |                    |

Finally, Mean Inclusive Costs of a Fat Lamb Flock may be summarised as follows under Statements A and B:—

STATEMENT "A."

|                     | Mean 1922-30 Costs.<br>Per Ewe. Percentages. |       |
|---------------------|----------------------------------------------|-------|
|                     | s. d.                                        | %     |
| Tending Flock ..... | 4 10                                         | 18.7  |
| Grazing .....       | 11 9                                         | 45.4  |
| Hand Feeding .....  | 2 8                                          | 10.5  |
| Water .....         | 0 3                                          | 0.9   |
| Marketing .....     | 1 0                                          | 3.8   |
| Incidentals .....   | 5 4                                          | 20.7  |
| Total Costs .....   | 25 10                                        | 100.0 |



## STATEMENT "B."

|                                                  | Mean 1922-30 Costs,<br>Per Ewe. Percentages. |              |  |
|--------------------------------------------------|----------------------------------------------|--------------|--|
|                                                  | s. d.                                        | %            |  |
| Wages .....                                      | 4 8                                          | 18.1         |  |
| Use of Horses .....                              | 0 4                                          | 1.4          |  |
| Use of Implements .....                          | 0 4                                          | 1.2          |  |
| Foodstuffs .....                                 | 2 2                                          | 8.5          |  |
| Grazing .....                                    | 11 9                                         | 45.4         |  |
| Purchase of Material other than Foodstuffs ..... | 0 4                                          | 1.2          |  |
| Freight .....                                    | 0 8                                          | 2.6          |  |
| Water .....                                      | 0 3                                          | 0.9          |  |
| Incidentals .....                                | 5 4                                          | 20.7         |  |
| <b>Total Costs .....</b>                         | <b>25 10</b>                                 | <b>100.0</b> |  |

Figures relating to Flock Revenues for 1929-30 in contrast with corresponding figures for 1922-29 and 1922-30 Periods respectively have been summarised below in Table XXIX.:

TABLE XXIX.—Summarising Flock Revenues for 1929-30, 1922-29, and 1922-30.

|                                  | 1929-30.<br>678 |          |  | 1922-29.<br>605 |          |  | 1922-30.<br>614 |          |            |
|----------------------------------|-----------------|----------|--|-----------------|----------|--|-----------------|----------|------------|
|                                  | Total.          | Per Ewe. |  | Total.          | Per Ewe. |  | Total.          | Per Ewe. |            |
|                                  | £ s. d.         | s. d.    |  | £ s. d.         | s. d.    |  | £ s. d.         | s. d.    | Percentage |
| Lambs sold .....                 | 753 9 3         | 22 4     |  | 501 1 5         | 16 7     |  | 532 12 5        | 17 4     | 45.6       |
| Ewes sold .....                  | 88 15 5         | 2 7      |  | 148 4 4         | 4 11     |  | 140 15 9        | 4 7      | 12.1       |
| Rams sold .....                  | 17 11 6         | 0 6      |  | 16 2 8          | 0 6      |  | 16 6 3          | 0 6      | 1.4        |
| Killed for rations .....         | 16 13 5         | 0 6      |  | 27 11 10        | 0 11     |  | 26 4 6          | 0 10     | 2.2        |
| Wool sold .....                  | 242 19 5        | 7 2      |  | 452 18 0        | 15 0     |  | 428 13 2        | 13 11    | 36.5       |
| Sheepskins sold .....            | 20 16 5         | 0 7      |  | 23 5 6          | 0 9      |  | 22 19 5         | 0 9      | 2.0        |
| Show Prizes .....                | —               | —        |  | 2 8 2           | 0 1      |  | 1 17 9          | 0 1      | 0.2        |
| Gross Flock Revenue              | 1,140 5 5       | 33 8     |  | 1,171 6 11      | 38 9     |  | 1,167 9 3       | 38 0     | 100.0      |
| Less Inventory Differences ..... | 694 0 1         | 20 6     |  | 279 15 5        | 9 3      |  | 331 11 0        | 10 9     |            |
| Net Flock Revenue..              | 446 5 4         | 13 2     |  | 891 11 6        | 29 6     |  | 835 18 3        | 27 3     |            |
| Less Expenditure..               | 1,239 7 0       | 36 7     |  | 727 4 5         | 24 1     |  | 791 4 9         | 25 10    |            |
| Net Profit or Loss.              | -793 1 8        | -23 5    |  | +164 7 1        | +5 5     |  | +44 13 6        | +1 5     |            |

Table XXIX. serves to show why the 1929-30 Season ended so disastrously for the Turretfield Flock. The value of the Wool per Ewe fell from a seven years' average of 15s. to 7s. 2d., representing a decline in values of £265 11s. for the whole Flock. Similarly, Inventory Debit differences, reflecting the general decline in Sheep values, rose from a seven years' average of 9s. 3d. to 20s. 6d. per Ewe, representing a decline in values for the whole Flock of £381 7s. 6d. In the aggregate, these declines in values represent a debit against the Flock of £646 18s. 6d., or 19s. 1d. per Ewe; on the other hand, the indifferent character of the season rendered necessary unusually heavy Hand Feeding, represented by a cost of 8s. 1d. per Ewe, as against a mean of 1s. 10d. for the preceding seven years. Relatively to preceding means, Hand Feeding would therefore have involved us in 1929-30 in additional expenditure of £211 17s. 6d.; the latter sum when added to the decline in Sheep and Wool values gives an unusual aggregate Debit of £858 16s. against 1929-30 Flock transactions. Had these three items been normal, the season would have closed on a Profit instead of a huge Debit Balance.

The unsatisfactory character of the 1929-30 season has had the effect of reducing preceding Revenue Means very considerably, namely, from 29s. 6d. per Ewe—the mean of the preceding seven years—to 27s. 3d.

## COST OF UPKEEP OF WORKING HORSES.

Apart from an occasional foal, Working Horses do not contribute anything directly to Farm Revenues, unless, indeed, circumstances compel the owner to take up contract work: Indirectly, however, through the power they supply, they must be looked upon as the mainspring behind farm production. Hence, an accurate determination of the



cost of this power is of paramount importance to all Farm Accounts; this determination, moreover, has acquired added interest in farm economics since the appearance of Tractors in our midst. I have summarised below in Table XXX. the cost of upkeep of Horses at Turretfield in 1929-30 in comparison with corresponding figures for 1922-29 and 1922-30 periods respectively.

TABLE XXX.—*Summarising Cost of Upkeep of Working Horses,*  
1929-30, 1922-29, and 1922-30.

|                                    | 1929-30.   |    |    | 1922-29.   |    |    | 1922-30.  |    |    |
|------------------------------------|------------|----|----|------------|----|----|-----------|----|----|
|                                    | £          | s. | d. | £          | s. | d. | £         | s. | d. |
| Opening Valuation ....             | —          | —  | —  | —          | —  | —  | —         | —  | —  |
| Purchases .....                    | —          | —  | —  | —          | —  | —  | —         | —  | —  |
| Foodstuffs .....                   | 492        | 11 | 3  | 431        | 19 | 2  | 439       | 10 | 8  |
| Pasture Grazing .....              | 29         | 7  | 4  | 57         | 11 | 11 | 54        | 1  | 4  |
| Water .....                        | 6          | 6  | 6  | 6          | 12 | 5  | 6         | 11 | 8  |
| Shoeing, &c. ....                  | 5          | 17 | 7  | 8          | 13 | 6  | 8         | 6  | 7  |
| Wages .....                        | 60         | 14 | 10 | 71         | 17 | 3  | 70        | 9  | 5  |
| Depreciation and repairs           | 23         | 0  | 8  | 35         | 12 | 10 | 34        | 1  | 4  |
| Sundries .....                     | 2          | 8  | 6  | 1          | 10 | 3  | 1         | 12 | 6  |
|                                    | 620 6 8    |    |    | 613 17 4   |    |    | 614 13 6  |    |    |
| Less Sales .....                   | 1,037 13 9 |    |    | 1,077 8 0  |    |    | 1,072 8 9 |    |    |
|                                    | 1,037 13 9 |    |    | 1,063 8 11 |    |    | 1,060 4 7 |    |    |
| Less Closing Valuation .....       | 358 0 0    |    |    | 433 6 0    |    |    | 423 17 10 |    |    |
| Net Cost of Upkeep ..              | 679 13 9   |    |    | 630 2 11   |    |    | 636 6 9   |    |    |
| Number of Horses ....              | 30         |    |    | 32.99      |    |    | 32.61     |    |    |
| Number of Horse-hours worked ..... | 30,918     |    |    | 30,402     |    |    | 30,466    |    |    |
| Cost of Horse-hour ....            | 5.28d.     |    |    | 4.97d.     |    |    | 5.01d.    |    |    |
| Cost of Horse eight-hour day ..... | 3s. 6.21d. |    |    | 3s. 3.8d.  |    |    | 3s. 4.1d. |    |    |

It will be observed that over a period of eight successive seasons the mean cost of upkeep of 32.61 Horses has been at the rate of 5.01d. per Horse-hour, or 3s. 4.1d. per eight-hour Horse day.

The relationship of the mean total cost of upkeep of 32.61 Working Horses at Turretfield—£636 6s. 9d.—to the mean area under crop, the mean area cultivated (crops plus bare fallow) and the total arable or farmed area is shown below:—

1. Mean inclusive cost of Upkeep of 32.61 Working Horses on 1,266 acres of arable land (38.82 acres per horse) . . . . . £636 6 9
2. Mean cost per acre of Upkeep of Horses in relation to mean area under crop (658 acres: 20.18 acres per horse) . . . . . 0 19 4
3. Mean cost per acre of Upkeep of Horses in relation to mean area cultivated (1,078 acres: 33.06 acres per horse) . . . . . 0 11 10
4. Mean cost per acre in relation to total arable area . . . . . 0 10 1

As a mean of 32.61 Horses have worked in the course of a year 30,466 hours, or 3,808½ eight-hour days, it follows that the mean effective work per Horse has been 117 days per annum.

The Mean Yearly Cost of Upkeep of Working Horses over eight consecutive seasons as set out in Table XXX. may be summarised as follows:—

|                                               | Mean Cost<br>of Upkeep of<br>32.61 Horses. | Mean Cost<br>per Horse. | Percentage. |
|-----------------------------------------------|--------------------------------------------|-------------------------|-------------|
|                                               | £ s. d.                                    | £ s. d.                 | %           |
| Wages .....                                   | 70 9 5                                     | 2 3 2                   | 11.1        |
| Foodstuffs .....                              | 439 10 8                                   | 13 9 7                  | 69.1        |
| Grazing .....                                 | 54 1 4                                     | 1 13 2                  | 8.5         |
| Depreciation and Repairs                      | 34 1 4                                     | 1 0 11                  | 5.3         |
| Sundries—                                     |                                            |                         |             |
| Plus Inventory decreases,<br>less Sales ..... | 38 4 0                                     | 1 3 5                   | 6.0         |
| Totals.....                                   | 636 6 9                                    | 19 10 3                 | 100.0       |



I have summarised in Table XXXI. Foodstuffs supplied and grazing areas made available to Working Horses in 1929-30 and in 1922-29 and 1922-30 periods respectively:—

TABLE XXXI.—*Summarising Foodstuffs supplied per Horse and Grazing made Available in 1929-30, 1922-29, and 1922-30.*

|                    | Units.     | 1929-30. | 1922-29. | Means.<br>1922-30. |
|--------------------|------------|----------|----------|--------------------|
| Cereal Hay Chaff.. | tons ....  | 3.47     | 3.48     | 3.48               |
| Long Cereal Hay .  | tons ....  | 0.57     | 0.29     | 0.32               |
| Oats .....         | bushels .. | —        | 5.53     | 4.89               |
| Barley .....       | bushels .. | —        | 2.54     | 2.25               |
| Grazing .....      | days.....  | 41       | 152      | 140                |
| Number of Horses.  | head ....  | 30       | 32.99    | 32.61              |

*Mean Foodstuffs per Horse per Day when not Grazing.*

|                    |           |       |       |       |
|--------------------|-----------|-------|-------|-------|
| Cereal Hay Chaff.. | lbs.....  | 23.99 | 36.60 | 34.65 |
| Long Cereal Hay .  | lbs.....  | 3.94  | 3.05  | 3.19  |
| Oats .....         | lbs.....  | —     | 1.04  | 0.87  |
| Barley .....       | lbs.....  | —     | 0.50  | 0.42  |
| Non-grazing days.. | days .... | 324   | 213   | 225   |

From the above it follows that when away from grazing areas Working Horses have been fed at Turretfield at the mean rate of 37.84lbs. of Cereal Hay Chaff and Long Hay, together with 1.29lbs. of Oats and Barley.

### THE COST OF PREPARATION OF FARM FALLOW.

As is generally the case in the settled areas of the State, Wheat crops in the Turretfield district, whether intended for grain or for hay, have usually been preceded by nine months or thereabout of well worked Bare Fallow. The costs involved by this practice vary considerably with the character of the soil, the depth of ploughing, the number of workings found necessary, and even with seasonal vagaries.

Turretfield costs in this direction have been shown below in Table XXXII. for 1929-30 Season in contrast with the Means of the 1922-29 and 1922-30 Periods respectively:—

TABLE XXXII.—*Summarising Expenditure incurred in Preparation of 1929-30 Bare Fallows in contrast with corresponding Means for 1922-29 and 1922-30.*

|                         | 1929-30. |           |  | 1922-29. |           |  | 1922-30. |           |       | Percentage |
|-------------------------|----------|-----------|--|----------|-----------|--|----------|-----------|-------|------------|
|                         | Total.   | Per Acre. |  | Total.   | Per Acre. |  | Total.   | Per Acre. |       |            |
|                         | £ s. d.  | s. d.     |  | £ s. d.  | s. d.     |  | £ s. d.  | s. d.     |       |            |
| Wages .....             | 109 9 10 | 4 7.8     |  | 90 18 9  | 4 4.0     |  | 93 5 2   | 4 5.3     | 16.0  |            |
| Use of Horses .....     | 320 13 4 | 13 7.5    |  | 253 13 7 | 12 3.6    |  | 262 1 0  | 12 5.7    | 44.9  |            |
| Use of Implements ..... | 58 18 10 | 2 6.0     |  | 47 5 9   | 2 3.5     |  | 48 14 11 | 2 3.9     | 8.4   |            |
| Rent (9 months) .....   | 184 11 4 | 7 10.1    |  | 163 12 2 | 7 11.2    |  | 166 4 6  | 7 11      | 23.5  |            |
| Rates and Taxes .....   | 16 9 7   | 0 8.4     |  | 12 6 1   | 0 7.1     |  | 12 16 6  | 0 7.3     | 2.2   |            |
| Inclusive Costs .....   | 690 2 11 | 29 3.8    |  | 567 10 4 | 27 6.3    |  | 583 2 1  | 27 9.2    | 100.0 |            |

|                   |                 |                 |               |
|-------------------|-----------------|-----------------|---------------|
| Areas Fallowed .. | Acres.<br>470.9 | Acres.<br>412.6 | Acres.<br>423 |
|-------------------|-----------------|-----------------|---------------|

It follows from the above that over eight consecutive seasons the inclusive costs of preparation of Fallows at Turretfield to March 31st of each year have been 27s. 9d. per acre, or 19s. 3d. exclusive of nine months' rent and proportionate Rates and Taxes.

### MEAN COSTS OF VARIOUS FARM OPERATIONS.

General Farming is an avocation involving numerous individual field operations, all of which contribute in varying degree to the financial success or failure of the season's work, and although in everyday practice actual costs of individual operations are rarely



taken into consideration, it is not without interest to place on record these costs, when accurate data are available for the purpose. The Turretfield Accounts have been kept in such a manner as to render possible the accurate determination of the costs of individual operations in any one season; and the means of these costs over a number of seasons may be taken to represent the position in Turretfield practice. I admit that Turretfield Means may not always agree with corresponding estimates that are sometimes given. In this connection I shall point out that with characteristic human optimism such estimates are usually based upon ideal conditions of work, that adequate allowance is rarely made for breakdowns, broken time, depreciation, &c., and that for the most part they do not correspond to every-day farm conditions. Data given below in Table XXXIII. are the means of costs incurred over large areas and continuous seasons, and for similar conditions can be accepted as reasonably accurate so long as they extend over three or more seasons:—

TABLE XXXIII.—*Summarising Costs of some individual Farm Operations at Turretfield.*

|                                             | Seasons. | Wages. |      | Horses. |      | Implements. |      | Sundries. |      | Total. |      |
|---------------------------------------------|----------|--------|------|---------|------|-------------|------|-----------|------|--------|------|
| Costs per Acre—                             |          | s.     | d.   | s.      | d.   | s.          | d.   | s.        | d.   | s.     | d.   |
| Fallow Ploughing....                        | 6        | 2      | 0·3  | 6       | 0·4  | 0           | 11·2 | —         | —    | 8      | 11·9 |
| Cultivating .....                           | 6        | 0      | 10·2 | 2       | 6·1  | 0           | 6·7  | —         | —    | 3      | 11   |
| Combine-Cultivating.                        | 4        | 0      | 8·2  | 2       | 1·5  | 0           | 7·1  | —         | —    | 3      | 4·8  |
| Harrowing .....                             | 6        | 0      | 3·8  | 0       | 9·2  | 0           | 1·6  | —         | —    | 1      | 2·6  |
| Cultivator-Harrowing                        | 1        | 0      | 7·3  | 1       | 8·0  | 0           | 1·0  | —         | —    | 2      | 4·3  |
| Combine-drilling ....                       | 6        | 0      | 10·4 | 2       | 5·6  | 0           | 8·5  | —         | —    | 4      | 0·5  |
| Binding .....                               | 6        | 1      | 10·9 | 1       | 5·3  | 5           | 3·1  | 3         | 0·2  | 11     | 7·5  |
| Complete Harvester—                         |          |        |      |         |      |             |      |           |      |        |      |
| Wheat .....                                 | 4        | 1      | 11·6 | 2       | 8·0  | 3           | 7·1  | —         | —    | 8      | 2·7  |
| Barley .....                                | 1        | 1      | 4·8  | 2       | 5·5  | 4           | 3·2  | —         | —    | 8      | 1·5  |
| Reaper-Thresher—                            |          |        |      |         |      |             |      |           |      |        |      |
| Wheat .....                                 | 6        | 1      | 7·0  | 2       | 11·7 | 3           | 11·8 | —         | —    | 8      | 6·5  |
| Barley .....                                | 3        | 1      | 7·5  | 3       | 0·4  | 4           | 5·4  | —         | —    | 9      | 1·3  |
| Pease .....                                 | 5        | 2      | 8·2  | 4       | 10·5 | 6           | 6·9  | —         | —    | 14     | 1·6  |
| Stripper (Wheat) ...                        | 1        | 3      | 2·4  | 2       | 8·4  | 3           | 2·7  | —         | —    | 9      | 1·5  |
| Stooking .....                              | 8        | 2      | 11·0 | —       | —    | —           | —    | —         | —    | 2      | 11·0 |
| Costs per Bushel—                           |          |        |      |         |      |             |      |           |      |        |      |
| Grading Seed Wheat.                         | 3        | 0      | 3·4  | —       | —    | 0           | 0·4  | 0         | 4·0  | 0      | 7·8  |
| Wet Pickling Wheat.                         | 3        | 0      | 1·6  | —       | —    | —           | —    | 0         | 0·5  | 0      | 2·1  |
| Grading and Dry<br>Pickling .....           | 2        | 0      | 5·0  | —       | —    | 0           | 0·9  | 0         | 5·6  | 0      | 11·5 |
| Complete Harvester—                         |          |        |      |         |      |             |      |           |      |        |      |
| Wheat .....                                 | 4        | 0      | 1·4  | 0       | 1·8  | 0           | 2·5  | —         | —    | 0      | 5·7  |
| Barley .....                                | 1        | 0      | 1·0  | 0       | 1·7  | 0           | 2·9  | —         | —    | 0      | 5·6  |
| Reaper Thresher—                            |          |        |      |         |      |             |      |           |      |        |      |
| Wheat .....                                 | 6        | 0      | 0·8  | 0       | 1·5  | 0           | 2·0  | —         | —    | 0      | 4·3  |
| Barley .....                                | 3        | 0      | 0·7  | 0       | 1·4  | 0           | 2·1  | —         | —    | 0      | 4·2  |
| Pease .....                                 | 5        | 0      | 2·4  | 0       | 4·3  | 0           | 5·8  | —         | —    | 1      | 0·5  |
| Stripper (Wheat) ...                        | 1        | 0      | 2·6  | 0       | 2·2  | 0           | 2·7  | —         | —    | 0      | 7·5  |
| Winnowing Wheat ...                         | 2        | 0      | 2·6  | —       | —    | 0           | 0·2  | —         | —    | 0      | 2·8  |
| Winnowing Pease ...                         | 4        | 0      | 2·7  | —       | —    | 0           | 0·3  | 0         | 0·1  | 0      | 3·1  |
| Winnowing Oats ....                         | 1        | 0      | 2·2  | —       | —    | 0           | 0·4  | —         | —    | 0      | 2·6  |
| Sewing Bags .....                           | 8        | 0      | 0·5  | —       | —    | —           | —    | 0         | 0·1  | 0      | 0·6  |
| Costs per Ton—                              |          |        |      |         |      |             |      |           |      |        |      |
| Stooking .....                              | 8        | 1      | 8·6  | —       | —    | —           | —    | —         | —    | 1      | 8·6  |
| Carting and stacking<br>in field .....      | 8        | 5      | 9·3  | 2       | 11·3 | 0           | 3·2  | —         | —    | 8      | 11·8 |
| Binding .....                               | 6        | 1      | 2·7  | 0       | 11·1 | 3           | 4·6  | 1         | 11·2 | 7      | 5·6  |
| Chaff-cutting, includ-<br>ing carting ..... | 8        | 6      | 0·7  | 1       | 9·6  | 4           | 3·8  | 1         | 1·2  | 13     | 3·3  |



## PART III.

RECORD OF LIVE STOCK CARRIED ON AREAS AVAILABLE  
FOR GRAZING.

On any Farm upon which Live Stock is kept, available grazing areas admit of classification under the following headings:—

1. Permanent Pasture usually non-arable.
2. Arable land temporarily out of cultivation; this area may include both land left out of cultivation for the whole season and land which is being progressively fallowed on the close of Seeding Operations. For the latter case it has been assumed in these Reports that in any given year land which is being fallowed remains available for grazing for three months of the year.
3. Stubble land becomes available for grazing from the completion of Harvest Operations to the 31st of March; thereafter, unless broken up for cropping, it is classed in these Reports as arable land temporarily out of cultivation. Hence, it is assumed that the stubbles of Winter-sown crops are available for grazing for three months of the year.
4. Specially sown grazing crops; at Turretfield usually Oats.
5. Fallow grazing to maintain weeds in check, a practice which much to the detriment of perambulating Live Stock is frequently abused of.
6. Occasional feeding-off of over-rank crops liable to lodging or blighting off.

Data concerning the extent to which these various types of grazing have been utilised at Turretfield have been carefully recorded since 1924, and 1929-30 results have been contrasted in Table XXXIV., with corresponding figures for the 1924-29 and 1924-30 periods respectively. For the most part Sheep have been the main type of grazing Live Stock in use. To a limited extent, however, both Cattle and Horses have had access to the grazing areas, and in order to bring down the figures to a common grazing unit individual Horses have been assumed to be the grazing equivalent of nine Sheep and Cattle of Seven Sheep.

TABLE XXXIV.—*Summarising Data concerning Sheep-carrying Capacity of available Turretfield Areas.*

|                       | Grazing Acres Available Expressed<br>as Acres per Annum. |                    |                    | Equivalent Number of Sheep<br>Carried per Acre per Annum. |                   |                   |
|-----------------------|----------------------------------------------------------|--------------------|--------------------|-----------------------------------------------------------|-------------------|-------------------|
|                       | 1929-30.<br>Acres.                                       | 1924-29.<br>Acres. | 1924-30.<br>Acres. | 1929-30.<br>Sheep                                         | 1924-29.<br>Sheep | 1924-30.<br>Sheep |
| Permanent Pasture .   | 252.00                                                   | 245.60             | 246.66             | 0.93                                                      | 0.95              | 0.94              |
| Arable Pasture ....   | 255.00                                                   | 281.79             | 277.32             | 0.85                                                      | 1.13              | 1.09              |
| Cereal Stubbles ....  | 118.25                                                   | 133.96             | 131.34             | 0.35                                                      | 0.31              | 0.31              |
| Pea Stubbles .....    | 2.37                                                     | 7.02               | 6.25               | 0.29                                                      | 0.92              | 0.88              |
| Grazing Crops .....   | 179.00                                                   | 121.38             | 130.98             | 1.02                                                      | 1.36              | 1.28              |
| Feeding off Cereals . | —                                                        | 7.01               | 5.84               | —                                                         | 0.16              | 0.16              |
| Totals ....           | 806.62                                                   | 796.76             | 798.39             | 0.99                                                      | 1.16              | 1.13              |

The foregoing statement shows that on a Farm of 1,533 acres in area, of which 1,266 acres are arable and 252 non-arable permanent pasture, an average of 1.13 Sheep per acre per annum has been successfully carried over six consecutive seasons on the area available for grazing—798 acres—or the aggregate equivalent of 902 Sheep per annum. Over the same period, on the other hand, the mean area under harvested crops has been 550 acres, and under Bare Fallow 409 acres.

In Table XXXV. expenditure incurred on behalf of the several grazing areas, inclusive of Rent, has been summarised for 1929-30 in contrast with corresponding figures for the 1924-29 and 1924-30 periods respectively.



TABLE XXXV.—*Summarising Expenditure incurred on Grazing Areas inclusive of Rent in 1929-30 and 1924-29 and 1924-30.*

|                                | 1929-30. |      |     | 1924-29. |      |    | 1924-30. |      |    |
|--------------------------------|----------|------|-----|----------|------|----|----------|------|----|
|                                | £        | s.   | d.  | £        | s.   | d. | £        | s.   | d. |
| TOTAL EXPENDITURE.             |          |      |     |          |      |    |          |      |    |
| Permanent Pasture .....        | 87       | 13   | 2   | 65       | 15   | 4  | 69       | 8    | 4  |
| Arable Pasture .....           | 157      | 16   | 1   | 153      | 7    | 9  | 154      | 2    | 6  |
| Cereal Stubbles .....          | 61       | 16   | 6   | 69       | 16   | 4  | 68       | 9    | 9  |
| Pea Stubbles .....             | 1        | 4    | 9   | 6        | 18   | 9  | 5        | 19   | 9  |
| Grazing crops .....            | 221      | 11   | 6   | 141      | 0    | 8  | 154      | 9    | 1  |
| Totals .....                   | 530      | 2    | 0   | 436      | 18   | 10 | 452      | 9    | 5  |
| EXPENDITURE PER ACRE.          |          |      |     |          |      |    |          |      |    |
|                                | s.       | d.   |     | s.       | d.   |    | s.       | d.   |    |
| Permanent Pasture .....        | 6        | 11·5 |     | 5        | 4·3  |    | 5        | 7·5  |    |
| Arable Pasture .....           | 12       | 4·5  |     | 10       | 10·6 |    | 11       | 1·4  |    |
| Cereal Stubbles .....          | 2        | 7·4  |     | 2        | 7·3  |    | 2        | 7·3  |    |
| Pea Stubbles .....             | 2        | 7·3  |     | 4        | 11·3 |    | 4        | 9·5  |    |
| Grazing Crops .....            | 3        | 1    | 6·7 | 20       | 6·5  |    | 20       | 9·3  |    |
| Mean Expenditure per Acre ...  | 13       | 1·7  |     | 10       | 11·6 |    | 11       | 4·0  |    |
| EXPENDITURE PER SHEEP.         |          |      |     |          |      |    |          |      |    |
|                                | s.       | d.   |     | s.       | d.   |    | s.       | d.   |    |
| Permanent Pasture .....        | 7        | 5·6  |     | 5        | 7·7  |    | 5        | 11·4 |    |
| Arable Pasture .....           | 14       | 6·5  |     | 9        | 8·4  |    | 10       | 2·9  |    |
| Cereal Stubbles .....          | 1        | 10·5 |     | 2        | 1·4  |    | 2        | 0·9  |    |
| Pea Stubbles .....             | 2        | 2·9  |     | 1        | 4·1  |    | 1        | 4·3  |    |
| Grazing Crops .....            | 21       | 2·5  |     | 15       | 1·4  |    | 16       | 2·7  |    |
| Mean Expenditure per Sheep ... | 13       | 2·7  |     | 9        | 5·8  |    | 10       | 0·4  |    |

Table XXXV. shows the mean value of grazing—1924-30—to have been equivalent to 10s. 0·4d. per Sheep grazed. Such a statement is, however, incomplete, since on any farm, particularly in early Winter, a certain amount of Hand Feeding must generally be resorted to; how heavy expenditure incurred in this direction was in 1929-30 has already been adverted to in another section of this Report. It is clear, therefore, that Hand Feeding costs should be added to normal expenditure incurred on the grazing areas. During the period under review—1924-30—inclusive costs of Hand Feeding have been as follows:—

*Inclusive Costs of Hand Feeding, 1929-30, 1924-29, and 1924-30.*

|                 | 1929-30. |    |     | 1924-29. |    |     | 1924-30. |    |     |
|-----------------|----------|----|-----|----------|----|-----|----------|----|-----|
|                 | £        | s. | d.  | £        | s. | d.  | £        | s. | d.  |
| Per Flock ..... | 275      | 7  | 1   | 72       | 13 | 10  | 106      | 9  | 5   |
| Per Sheep ..... | 0        | 8  | 1·5 | 0        | 2  | 2·1 | 0        | 3  | 2·1 |

Hence, over six consecutive seasons Mean Feed Costs per Sheep have been represented on the one hand by 10s. 0·4d. for normal expenditure on grazing areas, and on the other by 3s. 2·1d. for hand feeding costs, making an aggregate total of 13s. 2½d.

### GENERAL SUMMARY.

The salient features of this Report may be summarised as follows:—

#### PART I.: 1929-30 TRANSACTIONS.

1. The Turretheld Demonstration Farm has been run upon purely business lines since July, 1921.
2. The effective area of the Farm is 1,533 acres, of which 1,266 acres are arable, 252 acres milky pasture, and 15 acres occupied by buildings, yards, plantations, &c.
3. The main crop has been Wheat, immediately preceded by nine months of cultivated Bare Fallow, and followed, over a limited area, by Pease for grain and Oats for grazing purposes. The Pea stubbles have usually been sown to Wheat in the



succeeding season. Sheep have been the main type of revenue-earning Live Stock in use.

4. From the standpoint of both Crops and Pastures 1929-30 Seasonal conditions were even more unfavorable than in the immediately preceding season.

5. The mean Wheat yield was 16.69 Bushels per acre, as against 18.83 Bushels for the preceding eight seasons.

6. The inadequacy of the pastures led to handfeeding of Sheep at the rate of 8s. 1d. per Ewe, as against 1s. 10d. for preceding seven years; this has represented abnormal expenditure of £211 17s. 6d. against a Flock of 678 Ewes, or 6s. 3d. per Ewe.

7. For the second time in nine consecutive seasons the Balance Sheet closed on a Debit Balance, namely, £757 5s. Main contributing factors to the position were unfavorable character of the season, and fall in the prices of Wheat, Wool, and Sheep.

8. Accumulated Net Profits since 1921 aggregated on the 31st March, 1930, £1,461 1s., representing a Mean Annual Net Profit for nine consecutive years of £162 6s. 9d.

9. The original Capital value of Land, Improvements and Equipment was represented by £17,590 18s. 2d. This sum has been treated as a Loan, upon which interest has been paid yearly into the Treasury. This Loan has been reduced by £1,000 from Farm Earnings.

10. Net Farm Earnings, i.e., Revenue less Expenditure, but exclusive of Interest on Capital, totalled £8 13s. 7d. only in 1929-30, against Mean Earnings of £1,109 6s. 7d. for the preceding eight seasons. Similarly, in 1929-30 interest on Capital engaged was 0.05 per cent. only as against 6 per cent. for the preceding eight seasons.

11. Whilst the Turretfield Farm has cost the State nothing since 1921, it has, on the other hand, paid into the Treasury in the course of nine seasons the sum of £8,612 5s. 7d., representing interest on Loan and Overdraft and part repayment of Principal.

12. For the purpose of determining inclusive Farming Costs, Interest has been charged against the various accounts, not only on the original Farm Loan, but also on accumulated Net Profits, which have been treated as Turretfield Personal Capital. On March 31st, 1930, these combined interest dues aggregated £7,612 5s. 7d. and £721 3s. 8d. respectively.

13. Over nine seasons Capital items have been written down to the extent of £2,617 13s. 5d., or 39.1 per cent., of their original values.

14. Over eight successive seasons the mean cost of Board and Lodging for portion of the Staff has been at the rate of 22s. 4d. per week.

15. In 1929-30 Wages aggregated £1,141 18s. 10d., or 14s. 11d. per acre, as against £1,196 3s. 6d., or 15s. 7d. per acre for the preceding eight years.

#### PART II.: DETAILED ANALYSIS OF FARMING COSTS.

1. The mean (1921-29) Capital of the Farm has been represented by £18,637 19s. 10d., or £12 3s. 2d. per acre. In this total Land and Improvements stood for £9 4s. per acre, or 75.7 per cent. of the total; Tools and Plant for 15s. 9d., or 6.4 per cent.; Working Horses for 5s. 7d., or 2.3 per cent.; Revenue Earning Live Stock for 15s. 6d., or 6.4 per cent.; and Sundries for 22s. 4d., or 9.2 per cent.

2. Over eight consecutive seasons, inclusive farming costs at Turretfield have been at the mean rate of £4,261 17s. 4d. per annum, or £2 15s. 7d. per acre. Of this expenditure £3,208 0s. 2d., or £2 1s. 10d. per acre, has involved direct cash outgoings, whilst the balance—£1,053 17s. 2d., or 13s. 9d. per acre—has been absorbed by transfers, depreciation, and interest on Capital.

3. This Mean Expenditure has been met by a Mean Farm Output of £4,341 0s. 9d., or £2 16s. 8d. per acre, leaving a Mean Net Profit of £79 3s. 5d., or 1s. per acre. Towards this output Harvested Crops have contributed £2,679 12s. 9d., or 34s. 11d. per acre, and Live Stock £1,542 17s., or 20s. 2d. per acre. On the basis of areas actually occupied and used, Crops have contributed a mean of £3 13s. 3d. per acre and Live Stock £1 13s. 10d. per acre.



4. On the above data, it is calculated that in competent hands a personal Capital of £4,000 should suffice for the purchase, equipment, and working of a 1,000 acre Farm of the Turretfield type.

5. Over a period of eight successive seasons "General Expenses" that could not be debited against any particular account averaged £691 7s., or 9s. per acre, or again, 16.22 per cent. of Mean Inclusive Expenditure.

6. Over a period of eight successive seasons inclusive Costs of growing and harvesting a 19.46 Bushel Crop of Wheat sown on Bare Fallow have aggregated £4 14s. 8d. per acre, or 4s. 10d. per Bushel. In these costs actual field operations—fallowing, seeding, and harvesting—have absorbed £2 19s. 10d., or 3s. per Bushel, the balance meeting the claims of interest and incidental items.

7. In the Mean Costs of growing Wheat, Wages have been represented by 23s. 8d. per acre, or 1s. 3d. per Bushel; these costs would correspond to the Labor-Income of a farmer and family mainly responsible for manual operations, apart from any Net Profits that might accrue from the year's transactions.

8. In the mean costs of growing Wheat, Interest on Land and Improvements, Interest on Working Capital, and Depreciation on Improvements and Plant aggregate 1s. 8d. per Bushel. If to this sum we add Wages (exclusive of depreciation on living quarters), namely, 1s. 2d., we get a total of 2s. 10d. a Bushel, which when deducted from inclusive costs of 4s. 10d. leaves a balance of 2s. a Bushel. If, according to the views of some English Economists, the items enumerated, including 1s. 2d. for unpaid family labor, cannot legitimately be included in the costs of growing Wheat, then it would seem that even at 2s. a bushel the farmer and family exclusively responsible for manual operations could grow Wheat without personal loss. It is nevertheless difficult to understand how in the circumstances they would be in a position to feed and clothe themselves.

9. Over a period of eight years Mean Labor requirements of Wheat sown on Bare Fallow have been represented by 17½ hours per acre; or for a 9½ acre working day 1.84 days per acre; hence, under Turretfield conditions on the basis of 307 working days per annum one man could be responsible for 167 acres of Wheat.

10. The Mean costs of growing Wheat on Pea Stubbles have aggregated £3 7s. 7d., or 4s. 3d. a Bushel, for a 15.94 Bushel crop. Hence, under Turretfield conditions Wheat at 4s. 6d. a bushel would show a margin of profit if following Pease, but a loss if following Bare Fallow, notwithstanding heavier mean yields resulting from the latter practice.

11. Labor requirements of Wheat following Pease have been represented by 13 hours per acre; or 136 days for 100 acres of Wheat as against 184 days for Wheat sown on Bare Fallow.

12. Over eight consecutive seasons a 1½-ton Crop of Cereal Hay sown on Bare Fallow has cost £5 6s. 5d. per acre, or 59s. 6d. per ton in the stack; these figures correspond to £4 10s. 4d. per acre, or 50s. 6d. per ton in the stook.

13. In a cost of 59s. 6d. for Hay in the Stack, Interest on Land and Improvements, Interest on Working Capital, and Depreciation on Improvements and Plant absorb 18s. 7d. per ton and Wages 18s. 10d.; the balance, 22s. 1d., covers all other expenditure.

14. The Labor requirements of a 1½-ton Crop of Hay grown on Bare Fallow are represented by 26 hours per acre, or 2½ days, against 1.84 days for a corresponding Wheat Crop. The great bulk of the additional Labor is called for at Harvest time.

15. A 1½-ton crop of Cereal Hay—usually Oats—sown on Cereal Stubbles has cost £3 17s. 10d. per acre and 59s. 6d. per ton in the stack, i.e., exactly the same price per ton as corresponding Hay grown on Bare Fallow. Labor requirements, on the other



hand, are represented by 2½ days per acre for Hay sown on Stubbles, as against 2½ days for Hay grown on Fallow.

16. A 21.22 Bushel crop of Oats sown on Cereal Stubbles has cost £2 15s. 4d. per acre, or 2s. 7d. per Bushel. Labor requirements have been 1.19 days per acre sown.

17. A 17.26 Bushel crop of Barley sown on Cereal Stubbles has cost £2 12s. 1d. per acre, or 3s. per Bushel. Labor requirements have been 1.16 days per acre sown.

18. A 13.23 bushel Crop of Field Pease sown on Cereal Stubbles has cost £4 per acre, or 6s. 1d. per Bushel.

19. Labor requirements of the Field Pease crop have been represented by 15.53 Hours per acre, or 163 days for 100 acres. If we add these days to the 136 days required by the succeeding Wheat Crop, we get Labor requirements of 299 days for 100 acres of the Pease-Wheat Rotation as against 184 days only for corresponding area of normal Bare Fallow-Wheat Rotation. It follows that the Pease-Wheat Rotation offers greater advantages from the viewpoint of the employment of family Labor.

20. Over a period of eight successive years Mean Expenditure incurred for a Fat Lamb Flock averaging 614 Ewes has aggregated £791 4s. 9d. exclusive of Flock Depreciation, or 25s. 10d. per Ewe. In this total Wages have been responsible for 4s. 8d. per Ewe, or 18.1 per cent.; Feed, 14s. 2d., or 54.8 per cent.; and Incidentals, 7s., or 27.1 per cent.

21. Mean Gross Revenue has been at the rate of 38s. per Ewe, which after deduction of Mean Inventory differences leaves a Net Revenue of 27s. 3d., and a Net Profit of 1s. 5d. per Ewe only.

22. The 1929-30 Flock Debit Balance is shown to be attributable to the following items:—Decline in Wool values, £265 11s.; Decline in Sheep values, £381 7s. 6d.; abnormal Hand Feeding owing to unfavorable season, £211 17s. 6d.; representing in the aggregate abnormal expenditure of £858 16s., or 25s. 4d. per Ewe.

23. Over the eight seasons Mean Mortality of the Flock has been at the rate of 5.3 per cent. per annum.

24. Mean cost of Upkeep of Working Horses at Turretfield has aggregated 3s. 4d. per eight-hour day worked, or £19 10s. 3d. per annum. This figure corresponds to 19s. 4d. per acre on the mean area under crop, or 11s. 10d. on the mean area cultivated (crops plus Bare Fallow).

25. Over eight consecutive seasons the mean number of eight-hour days worked has been 117 per Horse.

26. The Mean Inclusive Cost of Farm Fallows to March 31st of each year has been 27s. 9d. per acre, or 19s. 3d. per acre, exclusive of nine months' rent and proportionate rates and taxes.

27. A Table has been prepared setting out mean costs of various individual farm operations in which Turretfield has been concerned.

### PART III.: RECORD OF LIVE STOCK CARRIED ON AREAS AVAILABLE FOR GRAZING.

1. Over six consecutive years the mean area available for grazing at Turretfield has been equivalent to 798 acres, or 52.1 per cent. of the total area of the farm; and over this period this grazing area has carried the equivalent of 1.13 Sheep per acre per annum.

2. Similarly, over the same period expenditure incurred upon the available grazing area, inclusive of Rent and Proportionate Rates and Taxes, has been at the mean rate of 10s. per Sheep. To this figure should be added mean Hand Feeding costs, namely, 3s. 2d. per Sheep, representing an aggregate cost, therefore, of 13s. 2d. per Sheep.

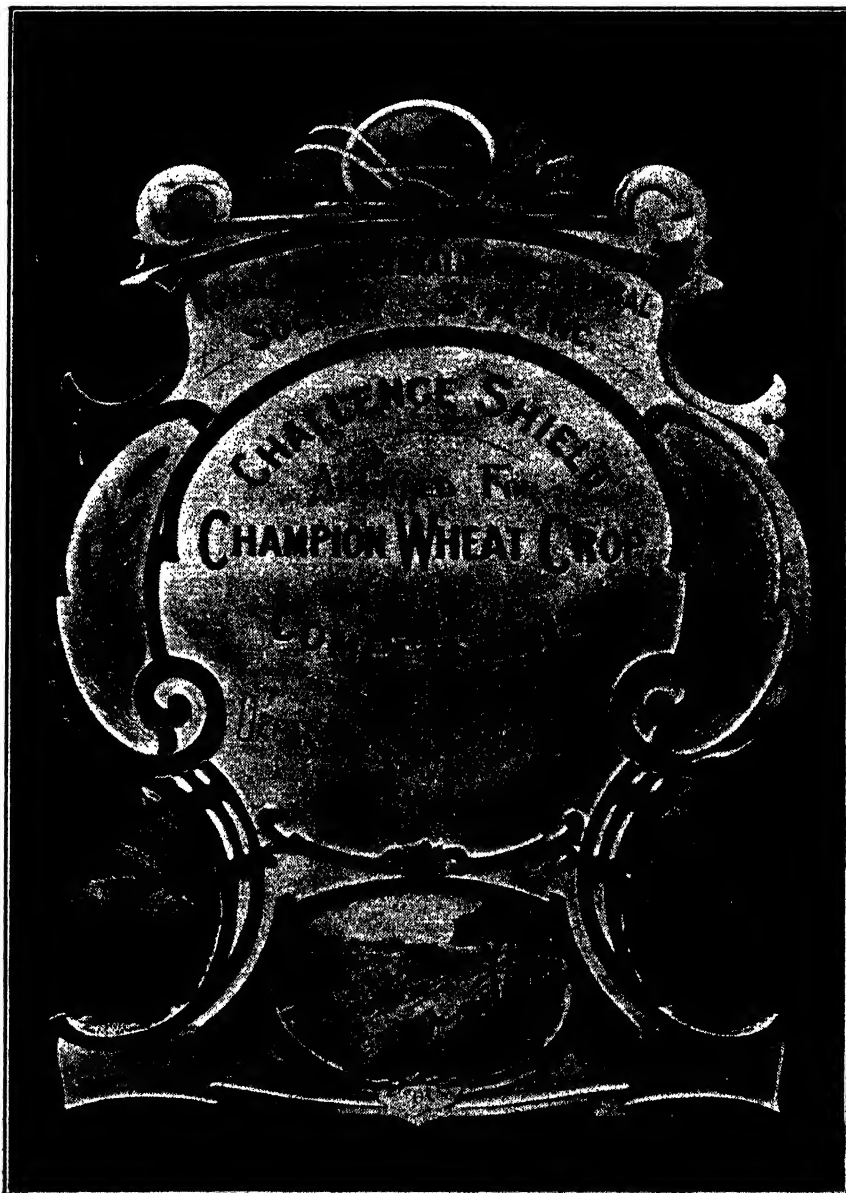
It remains for me to express appreciation of the efficient manner in which the Manager (Mr. F. E. Waddy) has attended to his duties and for the thoroughness with which the Accountant and Staff have prepared the material upon which this Report has been based.



## THE CHAMPIONSHIP WHEAT CROP COMPETITION.

[Won by Mr. H. C. M. PILGRIM, Wolseley.]

In his report on the Championship Wheat Crop Competition for the season 1930-31, Mr. W. J. Spafford (Deputy Director of Agriculture), who judged the entries, stated that for the past seven years Wheat Crop Competitions, supervised by the Department



of Agriculture, have been conducted in South Australia. For the first six seasons the Government subsidised these competitions, but unfortunately found it necessary to discontinue the subsidy for the past season, with the inevitable result that the number



of entries received showed a decrease on previous years. The Department of Agriculture supplies the judges to inspect the crops and make the awards and to prepare reports on all entries in the competitions.

Although the drought being experienced in the State continued unabated during the season 1930-31, and despite the fact that no subsidy was available, the interest in these competitions was maintained to a remarkable extent, and 19 of the 24 Crop Competition Districts conducted competitions, and 473 crop entries were submitted to the judges.

*Table Showing Progress of Wheat Crop Competitions.*

| Year.          | Districts Conducting Competitions. | Number of Crops Exhibited. |
|----------------|------------------------------------|----------------------------|
| 1924 . . . . . | 12                                 | 290                        |
| 1925 . . . . . | 13                                 | 248                        |
| 1926 . . . . . | 17                                 | 444                        |
| 1927 . . . . . | 19                                 | 525                        |
| 1928 . . . . . | 22                                 | 634                        |
| 1929 . . . . . | 21                                 | 520                        |
| 1930 . . . . . | 19                                 | 473                        |

In 1927 the Royal Agricultural and Horticultural Society offered as a prize in connection with Wheat Crop Competitions, conducted under the auspices of the Department of Agriculture, a silver challenge shield of the value of 50 guineas, and annually a small replica of the shield valued at five guineas. The Royal Society had in view the offer of special assistance in the encouragement of Wheat Crop Competitions, and in accepting the generous offer, the Government agreed to conditions laid down by the society, which were as follows:—

1. The prizes to go to the person exhibiting the best crop in the competitions supervised by the Department of Agriculture—the silver challenge shield for a period of 12 months immediately succeeding the award and the silver replica to become the absolute property of the winner.

2. The challenge shield, with the name of each year's winner engraved thereon, to be exhibited in the Town Hall or Institute nearest the farm on which the winning crop was grown.

3. The crop awarded first prize in each supervised district competition to be taken as an entry for the Championship Competition, except in any case in which it is thought by the judge of the district competition that the winning crop is not of sufficient merit to warrant inspection for the championship trophy.

4. All entries for the championship to be inspected by one judge. Such inspection to be undertaken in each district soon after the district judge has made his awards, but not before the crop has ripened.

5. Each competitor for the championship to be required to stage one bag of grain and one sheaf (about 1ft. in diameter) of grain in the straw at the Royal Spring Show following the competition.

#### THE ENTRIES.

In such a bad season and when no monetary assistance was forthcoming to help the competition committees, it was anticipated that there would be a considerably reduced number of competitors likely to have a crop in the Championship of the State Competition, but this did not prove to be so, and eventually 13 crops were judged for this valuable trophy, most of them being very high-class wheat crops.

#### *Previous Winners of the Championship Wheat Crop.*

1927—F. V. Trenorden, Bordertown (Federation wheat).

1928—F. Coleman, Saddleworth (Leak's Rustproof and Fondling wheats).

1929—F. V. Trenorden, Bordertown (Bena wheat).



## THE AWARDS.

In reporting on the entries, it has been decided to follow the practice of other years of indicating the crops which would have been placed second and third to the winner of the championship trophy had this been an ordinary competition, but the other crops are not shown in order of merit, and where any remarks are made on their crops the exhibitors' names are placed in alphabetical order and not according to points awarded. The awards and a brief description of the crops submitted in the competition are set out below:—

## THE CHAMPIONSHIP WHEAT CROP.

*H. C. M. Pilgrim, Wolseley.*

The winner of the championship wheat crop was Mr. H. C. M. Pilgrim, whose crop of Free Gallipoli wheat was placed first in the Tatiara Crop Competition, and his success means that on three of the four years since the championship was inaugurated the coveted trophy has been secured by a crop grown in the Tatiara district. The block of wheat was a really wonderful competition crop, showing every evidence that the very best farming methods are practised by the grower. It was a very clean crop, only containing a few patches where wild oats were rather heavy and a few isolated plants of King Island melilot and sheep weed. Some red rust was visible on the plants, but the attack was so light that the grain was unaffected and was of good quality. The outstanding features of the crop were the heavy yield of grain, the absence of strangers, and its wonderful evenness. The crop was remarkably true to type, and great difficulty was experienced in finding any other variety in the whole block. Other than a small portion in the north-east corner having lodged a little, it was a beautifully even and regular crop, standing up well to the large, well-filled heads.

The block of land which carried the crop grew oats in 1925, was in pasture in 1926, fallowed in 1927, was under wheat in 1928, and was bare fallowed in 1929, and received very thorough working throughout the fallowing period. The land was ploughed about 3½ in. in depth during April, was harrowed in about a month's time, cultivated and harrowed at the end of June, again had the double working at end of August, and end of October, was harrowed in early December and again at the end of that month, and was cultivated and harrowed at the end of February. In due season it was prepared for seeding, which was carried out at about June 1st, when 60 lbs. seed, which had been pickled with copper carbonate, was drilled in to the acre with 92 lbs. superphosphate (45 per cent.). For a "dry" season the amount of soil working carried out proved highly advantageous, and it must have had a lot to do with the very satisfactory manner in which this crop matured, for there were no evidences of "take-all" or "blighting" through the plants having ripened too rapidly, as was to be seen in many parts of the State this season.

## THE OTHER PLACED CROPS.

*R. J. Cliff, Anama.*—This heavy-yielding crop of Nabawa wheat, which won the Midlands Crop Competition for Mr. R. J. Cliff, was an attractive and in most ways an excellent competition crop. It was very free from weeds, except for a sprinkling of barley throughout the crop and small patches of a variety of weeds in a few crab-holes where the crop had been drowned out. Red rust was plentiful in the plants, but the grain was not injuriously affected, except in the small, second-growth heads. There was a sprinkling of a dark-headed wheat throughout the crop, but on the whole it was nice and true to type. There was some noticeable variation in the regularity of the crop, due to changes of soil type, and some of the heavier portions had lodged, but it was fairly even, nevertheless.

In 1928 the land on which the crop was grown was still unbroken pasture land carrying black-grass tussocks, and this was fallowed during 1929. The block was ploughed about 4 in. in depth in July, harrowed down in August, cultivated twice in



September and twice in October, and cultivated and harrowed in April. In the third week in May 75lbs. of seed was drilled in to the acre with 70lbs. superphosphate (45 per cent.).

The fact that the land had been grazed by sheep for many years and was carrying its first cultivated crop must have played some part towards the production of such a good block of wheat, but the cultivation, leading as it did to the reconsolidation of the land, was a very important factor, and Mr. Cliff is to be congratulated on this highly creditable exhibit.

*T. W. Roenfeldt, Greenock.*—It was a block of crop composed in part of Late Gluyas and the remainder of Ford with which Mr. Roenfeldt secured first prize in the Central District Crop Competition. Both varieties were nice and free from weeds, except that there was a sprinkling of oats in the Late Gluyas, quite a lot in the Ford, and a little barley was found in each. The Late Gluyas carried a fair amount of red rust, still the grain was really good, while the Ford appeared to be disease free. The two kinds were nice and true to type, containing only a light sprinkling of strangers. At the time of judging both varieties were shedding some grain and patches of the Ford had lodged rather badly. Just as they ripened they must have been lovely crops, but the shedding and lodging had rather tended to spoil them.

The land carrying the competition crops had been worked on the bare fallow-wheat rotation for a number of years. In 1929 it was ploughed with a mouldboard plough in June-July, harrowed down in August, cultivated in September, cross-cultivated in October, harrowed in December, cultivated in January, and harrowed in April. It was then prepared for seeding, and in mid-June 90lbs. of seed were drilled in to the acre with superphosphate, one portion receiving 2cwt. of 48 per cent. and the remainder 100lbs. of 100 per cent. per acre.

#### OTHER ENTRIES (in Alphabetical Order).

*H. E. Aldenhoven, Arthurton (Sepoy).*—At one time this crop of Sepoy, which won the Northern Yorke Peninsula Crop Competition, promised to yield over 45bush. per acre, but although it was not seriously diseased, it matured with unnatural rapidity, and the grain was so badly pinched as a consequence that the returns were appreciably reduced. It was a fairly clean crop, still, wild oats were heavy in patches and there were just a few weeds of other kinds. A little red rust was noticeable, but not sufficient to lead to the "closing up" of the crop. The crop had a fairly heavy infestation of strangers. Although a little lighter on the limestone outcrop, this was a very even and regular crop. The original stirring and practically all the workings of the fallow were given with a spring-time cultivator. The seeding was carried out during the first week in July, when 70lbs. of seed were drilled in to the acre with 1cwt. superphosphate (45 per cent.).

*E. J. Beinke, Kimba (Gluyas).*—This was a very clean crop of Gluyas which won the Buxton Crop Competition, as it only contained a few scattered plants of mustard, and only a single plant of barley was seen. Quite a lot of flag smut was found as well as a good deal of red rust, still the grain was not shrivelled in the least. There was too much admixture of other varieties and, except for that, it was a nice, fairly even crop, but rather on the light side. The land on which the crop was grown was fallowed in July after having carried an oat crop the previous season and was sown in May with 60lbs. seed and 90lbs. superphosphate (48 per cent.) per acre.

*Eagle Bros., Wandearah (Gluyas).*—The Western Crop Competition was won by this crop of Gluyas, which was nice and clean except for the presence of a lot of barley and just a little of a few other weeds. There was a fair sprinkling of flag smut, but worse still was the presence of so much red rust, particularly on the late patches, that the grain was on the thin side. The crop was far from being true to type, and it was only fairly even, some patches being really heavy and had lodged, whilst some small



patches were rather light. The land, which for some years has been worked on the bare fallow-wheat system, was disc ploughed in August, cultivated in October, and harrowed on several occasions. The seeding was done in June with 60lbs. seed and 66lbs. superphosphate per acre.

*Mrs. F. Hartmann, Monarto South (Currawa).*—Mrs. Hartmann won the Southern Crop Competition with a crop of Currawa which was fairly clean, but the wild oats were heavy in places. There was a sprinkling of barley throughout the crop and a few other weeds. Quite a fair amount of red rust was present, but without pinching the grain. There was a little flag smut, and odd plants were affected with loose smut. There was a light sprinkling of strangers in the crop and the northern headland was not cut right out, and so there was a heavy sprinkling of a brown-chaffed wheat along this edge of the crop. Although there were some variations due to different soil types, this was a fairly even crop. The field has been worked on the three-course system of pasture-fallow-wheat for some time. The fallowing was done with a mould-board plough in June, harrowed in August, and then kept cultivated throughout the season with a spring-tine cultivator. The seeding was done at the end of June with 65lbs. seed and 120lbs. superphosphate (45 per cent.) per acre.

*Henderson Bros., Maitland (Ford).*—This is the second year in succession that Messrs. Henderson Bros. have won the Mid-Yorke Peninsula Crop Competition, and on both occasions it was with a crop of Ford wheat. This year they exhibited a heavy-yielding crop which was really clean, containing only a few plants of several different weeds, the only bad one of which was drake. The whole crop was practically free from disease, there being only a few spots of red rust visible. There were too many strangers present to class the crop as being above fairly true to type. It was a fairly regular crop, producing good grain and in every way, except trueness to type, was a good competition crop. The field in which the crop was grown has been worked on the system of fallow-wheat-second cereal for several years, and after being ploughed the fallow was broken down with a cultivator, and was worked several times during the season with spring-tine cultivator and harrows, but particularly with the latter. Ninety pounds of seed were drilled in to the acre in early July with 120lbs. superphosphate.

*J. J. Honner, Sen., Brentwood (Currawa).*—This crop of Currawa which was grown at Warooka, gained first place in the Southern Yorke Peninsula Crop Competition, and was a fairly grainy crop, but contained a lot of weeds, including a fair sprinkling of barley, and was also affected with bunt and a little red rust. There was a little admixture of other varieties, but the crop was fairly true to type. It was a fairly even crop and had developed really good grain. The three-course system of fallow-wheat-barley had been practised for some years, and in 1929 the fallowing was done in July with a cultivator; it was double-harrowed in both July and August, was cultivated in October and March. Seeding was done about June 20th, when 90lbs. seed and 1cwt. superphosphate were drilled in to the acre.

*A. J. A. Koch, Lameroo (Sultan and Gluyas).*—The Chandos Crop Competition was won by this crop of Sultan and Gluyas. The Sultan was a very clean crop with just a few isolated weeds, as was the Gluyas also, except that there was a sprinkling of barley right through it. A lot of red rust was on the Sultan, whilst the Gluyas had only a few spots visible, but both kinds ripened too rapidly, and as a consequence the grain was really poor. The Sultan was nice and true to type and the Gluyas was very fair. The Sultan was the more even of the two, because the Gluyas contained some heavy, tangled patches. The land had been farmed on the fallow-wheat-oats system for some time. The seeding was carried out during the first week in July, when 60lbs. to 75lbs. of seed were drilled in with from 89lbs. to 100lbs. superphosphate (45 per cent.) per acre.

*G. W. Proctor, Yeelanna (Ford).*—A nice block of Ford won the Flinders Crop Competition for Mr. Proctor, it being a clean crop except for hop clover, and spear-



thistle, and small numbers of a few other weeds. There were a few patches of "take-all" and a little red rust, but the sample was good. It was fairly true to type, although a little brown-chaffed wheat was scattered throughout the crop. Despite the "take-all" patches, it was fairly even and regular. The system of farming practised for some years on this block of land has been that of fallow-wheat-pasture. The seeding was done at the end of May with 60lbs. seed being drilled in to the acre with 120lbs. superphosphate (48 per cent.).

*Sanders Bros., Yurgo (Caliph).*—This exceptionally clean crop of Caliph wheat, which won the Russell and Buccleuch Crop Competition, had hardly a single weed in it. Red rust developed so rapidly in the crop as it approached maturity that the grain was very much shrivelled. There was a light sprinkling of other kinds, still, it was very fair as regards trueness to type, and it was fairly even and regular. The block of land which carried the crop was still under mallee scrub in 1926, carried wheat in 1927 and 1928, and was fallowed in 1929. The block was fallowed in July, and between that time and seeding was cultivated five times and harrowed once. During the first week in June 45lbs. seed and 130lbs. superphosphate were drilled in to the acre.

*E. Smart, Gulgare (Ford).*—For the third time in the past four years a crop of wheat grown on this farm has won the Mid-North Crop Competition, and this year's crop of Ford again showed every indication of good farming methods. The crop was almost weed free, containing only a few very small patches of wild oats. There were a few spots of red rust, otherwise it was disease free. It was fairly true to type and was nice and even. Unfortunately, this otherwise well-grown and very attractive competition crop produced poor quality grain, because it matured so rapidly that it changed directly from the green stage to ripeness without developing that rich golden color which is characteristic of normal maturing. The land has been worked for some years on the simple system of fallow-wheat, and in 1929 the ploughing was done in the last week in June; it was cultivated in July, harrowed, cultivated, and harrowed in August, cultivated and harrowed at the end of September, bar-scraped at the end of January, cultivated in March and again in June. On about July 8th 85lbs. of seed and 87lbs. of superphosphate (48 per cent.) were drilled in to the acre.

Only one other wheatgrower in the State (Mr. F. Coleman, of Saddleworth) has put up the wonderful performance of having had three crops in the Championship Wheat Crop Competition, which has only been conducted for the past four years. Such an achievement is a very clear indication that the farmers are outstandingly skilful as wheatgrowers, and their methods could with advantage be followed by others similarly situated.

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## NATURAL AND FEDERAL DISABILITIES OF SOUTH AUSTRALIA, VIEWED AS AN ESSENTIALLY AGRARIAN STATE.

[By ARTHUR J. PERKINS, Director of Agriculture.]

*(Evidence given at Adelaide before the Commonwealth Joint Committee on Public Accounts, January, 1931).*

South Australia is without exploitable Coal deposits, and it follows that industries, social services involving the use of Power, Rail transport, and incidentally costs of rural production, are in some degree controlled by those from whom Coal is procured; nor has it permanent running waters from which Power might be economically derived. Again, apart from Copper deposits which at present are lying dormant, Gypsum, Salt, and limited Iron Ore deposits, it lacks mineral resources of any great importance. South Australia has no natural forests of appreciable commercial value, and its only permanent watercourse is the lower reaches of the River Murray. The logical corollary to these natural disabilities is a present-day lack of population in proportion to territory effectively occupied, and it must be admitted that natural conditions, quite as much as the Federal tie, have compelled South Australia to develop, in the main, along agricultural and pastoral lines. But apart from these natural disadvantages, the cumulative pressure of 30 years' Federal fiscal policy upon rural production in South Australia has been very severe. The avowed aim of this policy has been industrial self-sufficiency of a handful of people, and it has operated very much to the disadvantage of South Australia, the solvency of which as a State is ultimately dependent upon its ability to export rural produce at a profit. I shall support this statement by the following considerations:—

In the first place, it must be fairly obvious that a community depending so largely upon rural output for home expenditure and commitments abroad must be economically able to face World competition and to accept World prices, coupled with corresponding parity for home consumption. In other words, without loss to itself it must be able to sell in the cheapest markets. In such circumstances, its solvency would appear to rest upon corresponding ability of its primary producers to buy in the cheapest markets; nor is this possible except under the incidence of a revenue or low tariff policy. Unfortunately, from the standpoint of South Australia, and that of other rural States, Federal Fiscal policy has, from its inception, been one of High Tariffs, the height of which has progressively risen from period to period, culminating in the all but prohibitive rates of 1930.

What have been the outstanding effects of this policy? It has assisted to build up two huge cities—Sydney and Melbourne—and in the process it has forced up costs of rural production to such an extent that it is becoming increasingly difficult to dispose of Australian rural produce at a profit to producers on the markets of the World.

Between 1901 and 1929 the population of Sydney rose from 487,900 to 1,238,660, and that of Melbourne from 494,129 to 1,018,200, that is to say, increases of 154 per cent. and 106 per cent. respectively over a period of 28 years.

Again, the value of the yearly output of the factories of New South Wales and Victoria rose between 1907 and 1928—a period of 21 years—from £66,924,646 to £309,868,401, representing an aggregate increase in value of £242,943,755, or 363 per cent. above 1907 values.



It would appear, therefore, that the factories of our two large cities have flourished exceedingly behind the High Tariff Wall of Federal Policy, but unfortunately, apart from articles of Primary Production, such as Butter, Cheese, Flour, &c., their enormous and costly output has not proved exportable, and has in the main been reserved for Australian Home consumption. And however much their own private interests may have been injured thereby, Australian consumers and users have been compelled to purchase these locally manufactured articles at prices considerably in excess of World parity, with crippling results upon general Costs of Production. In this connection the following figures from the Commonwealth Year Book are illuminating. The total value of Commonwealth Exports for 1927-28 is given as £138,947,447, of which £134,158,348 represented Primary Produce and £4,789,099 manufactured articles other than primary products, or 3.4 per cent. of the total only. Hence, the infinitesimal value of locally manufactured articles, other than primary produce, from the standpoint of our commitments abroad should be fairly obvious.

The immediate effects of high tariffs would seem, therefore, to be that those on the wrong side of the Tariff Wall are forced to pay considerably more than World parity for articles manufactured in their midst, and under a drag-net Tariff of the type we have recently experienced the cumulative result is an inevitable all round increase in the cost of living, which in its turn leads sympathetically to progressive increases in the cost of Wages. The latter then become responsible for further increases in the necessities of life and industry generally, and are ultimately reflected in progressively increasing costs of Rural Production, upon which rests precariously at the present time the whole superstructure of the State.

In the years that immediately succeeded the War, the insidious rise in costs of rural production was to some extent masked by a brief period of unusually high prices for rural produce. This period has now come to an abrupt end, and I hold firmly to the belief that an important, if not the main factor behind the crisis through which South Australia is passing, and indeed, to a less degree, the Commonwealth as a whole, is the fact that World prices for primary products no longer balance our artificially swollen costs of production. This unfortunate position is attributable both directly and indirectly to a relentless policy of prohibitive tariffs; and since as a State we have not the advantages of the accumulated wealth of locally protected manufactures, and have to pay toll to the industrialised States for the necessities of life and industry, the Federal Government cannot, in my opinion, escape the responsibility for a position very largely of its own creation.

The time at my disposal does not permit of a detailed examination into Costs of Production of the various phases of rural activity, and I shall have to content myself with a few typical examples with which I am familiar.

Wheat, because of its ready adaptability to our conditions of climate and soil—and, prior to Federation, it could have been added to our economic conditions as well—Wheat looms very large in the history of the State. Indeed, together with Wool, we may be said to owe to it whatever development we have hitherto attained to. It follows, therefore, that anything relating to its Costs of Production is of paramount importance to the State, and indeed to a less degree to the Commonwealth as a whole. Unfortunately, the determination of a mean figure applicable to the State as a whole is an exceedingly difficult, if not impossible, proposition; these costs must necessarily vary from district to district, from farm to farm, and even from season to season on one and the same farm. Nevertheless, in existing circumstances, I do not believe that anyone could be found with any real knowledge of the question who would maintain that 2s. per bushel and less on the farm could possibly meet current costs of production. I have been responsible for a Government Farm (Turretfield) which for nine successive years has been run from its own revenues without the assistance of a Government grant, and during the course of which all expenditure has been submitted to



detailed analysis. I append, as a contribution to the subject, itemised statements of actual Costs of Production of Wheat over eight successive seasons, during the course of which the mean yield per acre was 19.64bush.

|                                            | Mean Costs Incurred. |              |                  |  |
|--------------------------------------------|----------------------|--------------|------------------|--|
|                                            | Per<br>Acre.         | Per<br>Bush. | Per-<br>centage. |  |
|                                            | £ s. d.              | s. d.        | %                |  |
| STATEMENT "A."                             |                      |              |                  |  |
| Preparation of Fallows to March 31st ..... | 0 19 9               | 1 0          | 20.8             |  |
| Seeding Operations .....                   | 1 3 4                | 1 2          | 24.7             |  |
| Harvest Operations .....                   | 0 16 9               | 0 10         | 17.7             |  |
| Incidental Expenditure .....               | 0 11 9               | 0 8          | 12.5             |  |
| Interest on Working Capital .....          | 0 7 1                | 0 4          | 7.4              |  |
| Rent (18 months) .....                     | 0 16 0               | 0 10         | 16.9             |  |
| Inclusive Costs .....                      | 4 14 8               | 4 10         | 100.0            |  |

|                                      |        |      |  |       |
|--------------------------------------|--------|------|--|-------|
| STATEMENT "B."                       |        |      |  |       |
| Wages (direct and indirect) .....    | 1 3 8  | 1 3  |  | 25.9  |
| Use of Horses .....                  | 0 16 6 | 0 9  |  | 17.4  |
| Use of Implements .....              | 0 6 2  | 0 4  |  | 6.5   |
| Seed .....                           | 0 8 10 | 0 5  |  | 9.4   |
| Purchase of Essential Material ..... | 0 12 4 | 0 8  |  | 13.0  |
| Incidentals .....                    | 0 4 1  | 0 3  |  | 4.4   |
| Interest on Working Capital .....    | 0 7 1  | 0 4  |  | 7.4   |
| Rent (18 months) .....               | 0 16 0 | 0 10 |  | 16.9  |
| Inclusive Costs .....                | 4 14 8 | 4 10 |  | 100.0 |

|                                                            |        |      |  |       |
|------------------------------------------------------------|--------|------|--|-------|
| STATEMENT "C."                                             |        |      |  |       |
| Interest on Land and Improvements .....                    | 0 16 0 | 0 10 |  | 16.9  |
| Interest on Working Capital .....                          | 0 7 1  | 0 4  |  | 7.4   |
| Depreciation on Improvements and Plant ..                  | 0 9 0  | 0 6  |  | 9.5   |
| Wages (exclusive of depreciation on living quarters) ..... | 1 2 9  | 1 2  |  | 24.1  |
| Purchase of Essential Material .....                       | 0 12 4 | 0 8  |  | 13.0  |
| All other costs .....                                      | 1 7 6  | 1 4  |  | 29.1  |
| Inclusive Costs .....                                      | 4 14 8 | 4 10 |  | 100.0 |

I lay no claim for these costs that they are necessarily representative of South Australian mean conditions. They are, however, the only authentic ones at present available, and I do claim that for a mean average yield of 19½bush., and on a farm on which the land is heavy to till and management and labor are paid for in Cash, Costs both per acre and per bushel are reasonably accurate. These costs imply that on a farm wholly worked by the owner and his family, Wheat at 4s. 10d. per Bushel, besides yielding reasonable interest on Capital invested and providing for depreciation, leaves to the farmer and family a Labor Income at the rate of £1 3s. 8d. per acre under Wheat, or of 1s. 3d. per Bushel reaped. Two shillings a bushel, on the other hand, would pay neither interest, depreciation, nor wages, but on a 19½bush. harvest would suffice to meet all other costs.

It is true that in many parts of the State the rental value of the land is less than at Turretfield and tillage operations less costly, but, on the other hand, mean yields per acre are also correspondingly lower. Hence, whilst mean costs per acre would certainly be lower—possibly as low as £3—there would be little or no difference in mean costs per bushel; a 12bush. crop costing £3 per acre would represent a corresponding cost of 5s. per Bushel.



Finally, I shall add that most of the items included in the Costs of Production of Wheat admit of appreciable reductions under a policy of Low Tariffs. Indeed, I am prepared to go as far as to say that if Port Adelaide were a free port, even Wheat at 2s. a Bushel would not necessarily prove a losing proposition.

In 1913 I had occasion to put on record current values for farm machinery, essential material, tools, &c. These values are shown below in contrast with corresponding 1930 figures:

|                                                    | 1913. |    |    | 1930. |    |    | Percentage |
|----------------------------------------------------|-------|----|----|-------|----|----|------------|
|                                                    | £     | s. | d. | £     | s. | d. | Increases. |
| Essential Farm Machinery ...                       | 518   | 17 | 0  | 826   | 19 | 4  | 59.4       |
| Farm Harness .....                                 | 21    | 16 | 9  | 31    | 1  | 8  | 42.3       |
| Miscellaneous Tools .....                          | 3     | 9  | 3  | 6     | 3  | 1  | 77.7       |
| Other material essential to<br>Wheat growing ..... | 91    | 13 | 0  | 113   | 7  | 11 | 23.7       |
| Totals .....                                       | 635   | 16 | 0  | 977   | 12 | 0  | 53.6       |

Hence, on the items indicated above alone, purchase costs since 1913 have increased by 53.6 per cent., and allowing 16 per cent. for Interest and Depreciation these increases would represent on an average farm an additional yearly charge of £54 13s. 9d., or an additional cost of 4d. to 5d. per Bushel on a 3,000bush. Harvest.

How heavily interest and depreciation charges weigh upon the farmer, and more particularly upon the farmer handling relatively small areas, was made clear in a recent inquiry which I made into Capital invested in South Australian Wheat Farming. Figures given below summarise the position, apart from interest on land or rent.

*Estimated Mean Interest and Depreciation on Improvements and Working Plant on Farms of Varying Dimensions.*

|                        | Mean Areas. | Assumed<br>Mean Yield<br>per Acre. | Mean<br>Interest<br>and<br>Depreciation |
|------------------------|-------------|------------------------------------|-----------------------------------------|
|                        |             |                                    | per Bushel.                             |
|                        | Acres.      | Bush.                              | s. d.                                   |
| Very Small Farms.....  | 287         | 18.87                              | 2 2                                     |
| Small Farms .....      | 633         | 17.78                              | 2 0                                     |
| Average Farms .....    | 988         | 14.05                              | 1 11                                    |
| Large Farms .....      | 1,651       | 11.86                              | 1 10                                    |
| Very Large Farms ..... | 3,077       | 10.00                              | 1 9                                     |

The above figures are based upon an inquiry into the position of 129 South Australian Wheat Farms. It will be observed that interest and depreciation charges on improvements and working plant are practically equivalent to current prices for Wheat. The uneconomic height to which these charges have attained is one of the consequences of a high tariff policy.

In 1927 I had occasion to keep the accounts of a prominent Dairyman situated on the River Murray Reclaimed Swamp Lands, and notwithstanding the fact that for the year his Herd averaged more than 1,000galls. of Milk for every Cow in the herd, the inclusive Costs of the Milk produced were a shade under 9½d. per gallon.

I recognise freely that South Australia is not the only State dependent upon rural output for continued prosperity; and although this dependence may not be quite as great as our own, the Commonwealth might perhaps justly be described as a federation of rural States with two highly industrialised Cities. And the recent appeal of the Prime Minister for maximum Wheat Production throughout the Commonwealth may be accepted as a welcome federal awakening to the major importance of rural production in our Common Economic life. But unfortunately even in this matter of rural production we have special difficulties of our own which tend to place South Australia at a disadvantage relatively to the better endowed Sister States, and to these difficulties I propose now drawing attention.



It is a well recognised fact that over the bulk of Australia Rainfall and its seasonal distribution dominate Crop Production and the relative abundance of grass or Livestock carrying capacity of the land. In this connection, out of territory 380,070 square miles in area, 310,660 square miles or 81.7 per cent. of South Australia receive less than 10in. of yearly Rainfall and lie therefore outside normal cropping areas. Corresponding percentages for land outside the 10in. rainfall line for Sister States are as follows:—Western Australia, 49.9 per cent.; New South Wales, 15.7 per cent.; Queensland, 12 per cent.; whilst in Victoria and Tasmania a rainfall in excess of 10in. is received by each State throughout their respective territories. It must be clear, therefore, that in South Australia the available cropping area is very much restricted by unfavorable rainfall conditions.

Again, of the country receiving in South Australia 10in. and more of rain, a limited proportion only is suitable for agricultural operations. In this connection it is estimated that not more than 15,000,000 acres can be described as arable land, that is to say, 33.8 per cent. only of the land receiving 10in. and more of rain and 6.4 per cent. only of South Australia's total territory.

Moreover, of our arable area in the neighborhood of 10,000,000 acres, or two-thirds of the total is "Mallee Land," and as such of relatively low natural fertility. It is this fact that tends to keep our mean Crop yields at a relatively low level and to make it extremely difficult for at least 50 per cent. of our farmers to face artificially raised costs of production, and their personal straits are reflected in the financial difficulties of the State.

Another serious difficulty is the absence of good underground water supplies for Livestock and other purposes over the greater part of South Australia. This has rendered necessary the building up of costly reservoirs with attendant reticulation systems to meet the needs of an extremely scattered population, and the building and upkeep of these national works has been a heavy burden on State finances.

Our pastures generally and our hot, dry summers do not lend themselves generally to Dairying, except with the costly assistance of hand-feeding over six months of the year, and we have usually found ourselves compelled to import butter for home consumption over portion of the year. This disability has hitherto hampered our attempts at closer settlement. Apart from the very limited areas of Reclaimed Murray Swamps and portions of our Hills Districts, the only important tract of country likely to prove suitable for Dairying is situated in the South-Eastern Statistical Division of the State. Unfortunately much of the latter country is usually under water in Winter and has already involved the State in heavy expenditure for drainage, and is likely to cost a good deal more before the work can be completed.

It is true that we possess important tracts of country admirably adapted to fruit and vine-growing, whether under irrigation or conditions of natural rainfall. Unfortunately, the federal high tariff policy has forced up Costs of Production to such an extent that to-day it is no longer possible to market fruit and fruit products overseas to any great advantage. The unenviable position of the canned and dried fruit industries is a case in point. To these might be added the stagnation of the Olive Oil industry, which is barely able to face foreign competition on the home market, although admirably adapted to local conditions of climate and soil, and which prior to federation appeared to be full of promise for the State. But with the cost of mere picking in the neighborhood of £5 a ton, it is little wonder that Olive growing is looked at askance by would-be growers. And it is analogous reasons that prevent us from developing a profitable overseas trade in Pig Products.

Finally, our high Railway rates which are partly one of the consequences of the scattered nature of our land settlement and partly one of the consequences of a high



tariff policy, are very burdensome upon local rural production. These rates are relatively heavier than in neighboring States as the following examples will show:—

|                         | Wheat.                        |                                | Superphosphate.              |                               |
|-------------------------|-------------------------------|--------------------------------|------------------------------|-------------------------------|
|                         | 1st 50<br>Miles.<br>Per Bush. | 1st 100<br>Miles.<br>Per Bush. | 1st 50<br>Miles.<br>Per Ton. | 1st 100<br>Miles.<br>Per Ton. |
|                         | <i>d.</i>                     | <i>d.</i>                      | <i>s. d.</i>                 | <i>s. d.</i>                  |
| South Australia .....   | 2-97                          | 4-43                           | 5 5                          | 9 8                           |
| New South Wales .....   | 2-53                          | 3-89                           | 5 3                          | 7 0                           |
| Victoria .....          | 2-16                          | 3-32                           | 3 8                          | 5 7                           |
| Western Australia ..... | 2-68                          | 3-54                           | 3 3                          | 4 1                           |

I understand that the warrantableness of some of the developmental expenditure incurred by the State within recent years has been questioned, and in particular expenditure incurred in the gradual development of Eyre Peninsula.

In the latter connection it is necessary to draw attention to the fact that 60 per cent. of the area of the State lies to the West of Port Augusta, including Eyre Peninsula and its Northern hinterland, and 40 per cent. only to the east of the Port, including the earlier settled portions of the State.

It seems to me unthinkable that any State could afford to leave idle more than 50 per cent. of its effective area, when it was known that a large proportion of this was suitable for Sheep or Wheat, upon which the Eastern portion of the State had been effectively settled. Attention should be drawn to the fact that the greater part of the Peninsula was covered with Mallee or low scrub and that the actual cost of clearing and development has fallen not upon the State, but upon the individual settler, and frequently to his eventual loss. Nor should it be forgotten that however good the quality of the soil, Mallee Blocks, reclaimed by individual settlers, cannot as a rule be expected to reach normal farming conditions until at least 10 years from date of original settlement. Unfortunately, Settlers have been faced by a series of unfavorable seasons since early settlement and the State has been compelled to supply them with special assistance to enable them to keep on the land. The position has been further complicated by the settlement of Returned Soldiers on the only available Crown Lands of the State, and many of them have unfortunately proved unsuitable settlers.

The main State developmental works are represented by a narrow gauge railway line and an attempt to provide water to the central areas from the Southern end of the Peninsula. The expenditure involved was inevitable if the Peninsula were to be settled, and in my opinion with the eyes of land-hungry neighbors upon our sparsely settled areas no State could afford not to attempt the settlement of more than one-half of its available area. It is probably true that public works on the Peninsula do not at present pay interest and are therefore a burden upon taxpayers of the eastern half of the State. But with a complete knowledge of the Peninsula and its conditions I am prepared to maintain that, given a fiscal policy more in keeping with the rural requirements of the Commonwealth than we have hitherto experienced, Eyre Peninsula should, in the course of time, be able to meet interest on any expenditure that may have been incurred on its behalf. I stated in evidence before an earlier Commission that between 1935 and 1940 the Peninsula should carry in the neighborhood of 1,500,000 acres of Wheat, from which 15,000,000 bush. might be expected, and that its flocks should expand to from 1,600,000 to 1,800,000 Sheep. To these opinions I still adhere, with the addition that the Dairying and Poultry Industries are also capable of important development over this area.



The costliness of the River Murray settlements has also been criticised, and in some directions perhaps not without reason. Mistakes have no doubt been made, but could it have been otherwise in a national undertaking of this magnitude? Two factors have added very considerably to the costs incurred, namely:—

- (1) the hurried settlement of numerous Returned Soldiers anxious to resume normal civil life, which for sentimental reasons could not have been avoided, and
- (2) direct and indirect influence of a high tariff policy.

I am of the opinion that in its attempts at settlement of Eyre Peninsula, and at development of the River Murray Irrigation areas, particularly in relation to the settlement of Returned Soldiers, South Australia has undertaken national work of major importance, and that considering that the policy that has led to the enrichment of the industrial States has led to corresponding impoverishment of South Australia, it seems reasonable that the Commonwealth as a whole should assist this State to carry a burden which unfortunately it is no longer able to bear without outside assistance.

It is often stated that the countryside benefits from economic association with large centres of population, and whilst from the general viewpoint this is undoubtedly true, it cannot be said to apply to the association of essentially rural communities, such as South and Western Australia, with distant urban centres, such as Sydney and Melbourne, the home territories of which are amply adequate for the supply of all requirements. Unfortunately, the collection of Interstate statistics on the subject has been abandoned since 1909, and it is no longer possible to set out the actual position on the basis of exact figures. From inquiries that I have made, however, it would appear that the value of our Interstate exports of Horticultural Produce for the 12 months ending on June 30th, 1930, did not exceed £170,000, and consisted chiefly of Oranges and Tomatoes consigned to the Melbourne Market. Our Wines and Brandies, on the other hand, have undoubtedly benefited from Federation, and now have an Interstate export trade of a yearly value varying from £500,000 to £750,000. But this is a very small set-off to the value of the manufactured articles we are compelled by High Tariffs to receive from the industrialised States. Moreover, notwithstanding the federal agreement, the course of Interstate trading is not all plain sailing; witness the uncomfortable position of South Australian Exporters of Eggs on the Sydney market, where special measures appear to have been taken to prevent them poaching on local preserves.

The Federal disabilities under which South Australia appears to me to labor may be summarised as follows:—

1. Natural conditions have made of South Australia an essentially rural State, and unfortunately she has been unequally yoked in a federation with two large States which have gradually expanded upon industrial lines.

2. Federation has checked the development of local industries, and in some cases obliterated them. It has raised the cost of necessities of life and industry, with corresponding increase in costs of rural production, upon which our economic life is wholly dependent. Natural conditions compel us to sell in the cheapest markets and artificial ones to buy in the dearest.

3. And to-day South Australia finds it almost impossible to market surplus agricultural produce overseas at a profit to producers and to the State.

4. The practical disappearance of taxable industrial wealth from the State has thrown the burden of taxation upon rural production and impoverished the State and its main producers.

5. Even as a rural State, South Australia suffers in comparison with its better endowed neighbors. Over 81 per cent. of its territory lies outside the 10in. rainfall line and no more than 6.4 per cent. of its total territory is suitable for agricultural operations. Moreover, the major portion of the land in cultivation is "Mallee" land, and therefore of relatively low natural fertility.

6. The absence of good underground water supplies has rendered necessary costly artificial supplies for both town and country, and has helped to inflate costs of rural production, both directly and indirectly.



7. Closer settlement has been hampered by Federal Fiscal Policy, with the result that we have been thrown back upon extensive farming and the normally low returns per acre which characterise this type of farming.

8. Forty per cent. of the territory of South Australia is carrying the burden of three national undertakings of major importance, in which the Commonwealth is intimately concerned, namely:—

(a) the development of Eyre Peninsula, which may eventually claim the position of a separate State.

(b) the opening up of the River Murray Irrigation Areas, and

(c) the settlement of Returned Soldiers.

9. The limits of local taxation appear to have been reached, if not over-stepped, and to remedy the position in which we find ourselves, I know of no alternative but—

(a) a radical change in Federal Fiscal Policy towards low tariffs for revenue only.

(b) substantial Federal grants enabling the State Government gradually to reduce local taxation, which eventually would be reflected in lower cost of rural production.

(c) Secession which would restore to us our liberty of action and enable us to work out our destinies on our own lines.

I recognise that in ordinary circumstances my statement of our disabilities should end here, and that any addendum would be in the nature of an anti-climax. Quite recently, however, I happened to come across an article in the *Nineteenth Century Magazine* entitled "A Policy for Central Europe." The article, which is by a former Minister of Agriculture of Czechoslovakia, is a reply to the suggestion that Europe should adopt a Federal Tariff Union. The position as pictured by Doctor Milan Hodza is so similar to our own that I take the liberty of adding a few extracts as an appendix to my personal statement:—

If we imagine Pan-Europe as a Confederation with the tariff barriers raised, as a unitary customs area, then it is clear that Pan-Europe is not possible, and, even were it possible, that it could not be advantageous, and therefore not permanent. Europe is not an economic unity. West-Europe, predominantly industrial, has other economic interests than the agrarian States of Central Europe. West-Europe has a surplus output of industrial products, we have a surplus output of agricultural products, and therefore we must make a distinction between what would benefit the international capital invested in West-European industry and what the farmer in Central Europe urgently needs. . . .

"If Pan-Europe were to arise suddenly, sweeping away all the Tariff barriers, including the agricultural, we should be overwhelmed by the economic and financial power of West-European industry. We should have all the disadvantages of a great customs area dominated by industry, and we should have neither the strength to resist nor the guarantee of an economic safeguard for agriculture. That would mean the pauperisation of agrarian States of Central Europe and the pauperisation of agrarian democracy itself. If the farmers of these States cannot safeguard their products, and the State cannot safeguard its small peasant landholders, that would mean that agrarian democracy would be shaken to its foundations in Central Europe, since the agrarian represents the only stable element. It would mean that the ground was cut away from under the feet of cultural development in Central Europe. We should be threatened by the danger of chaos which is to-day, in the neighborhood of Soviet Russia, altogether unthinkable.

"That would be the effect of Pan-Europe as it is at present conceived organised from the standpoint of West-European capitalism and industrialism. It is for this reason that we must approach the question of international 'rapprochement' by progressing from the smaller problems to the greater, and not *vice versa*. Only in this way can Pan-Europe be made a reality, resting not on public manifestations of international enthusiasm, but on a real abolition of the economic friction between the different States."

There, it seems to me, speaks a man of far greater vision than the South and West Australian protagonists of Federation in the last century. We accepted federation and unified customs without taking thought of our special agricultural interests, and now we are suffering for the lack of thought of the Fathers of Federation and the "public manifestations" of federal "enthusiasm." It is much to be hoped that in common fairness, future generations will not be permanently penalised for the hastiness and lack of foresight of their predecessors.



## REPORT ON PIG FEEDING EXPERIMENTS AT ROSE-WORTHY AGRICULTURAL COLLEGE.

[By W. R. BIRKS, B.Sc., Agric., Principal, and S. E. WHICKER, D.D.A.,  
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A further pig feeding test was carried out in the College piggery during the Spring of 1930, with the following main objectives in view:—

1. To test the effects of the addition of a complex mineral mixture to the normal ration.
2. To compare the relative effects of superphosphate in this mineral mixture with those of the chemically less active phosphatic materials, bonemeal, and ground rock phosphate.
3. To compare the efficacy of a mixed grain ration with that of a single grain ration (*viz.*, barley).
4. To test the effects, economic and other, of allowing an unlimited food supply in self-feeders on the "free choice" principle.

For the purpose of the experiment eight pens of four pigs each—pure Berkshires—were employed. The ages of these pigs at the commencement of the test ranged from 19 weeks to 26 weeks and their live weights from 54lbs. to 148lbs. Seven pens were housed in a rank of similar sties, built of cement concrete, measuring 8ft. by 16ft., half



The Open Yard in which Pigs of Pen No. 8 were Run.

covered in, and with the covered part floored with hardwood. All ordinary precautions, as to sanitation, the control of vermin, &c., were observed. Pigs of the eighth pen were run in a yard measuring 150ft. by 27ft., in which there was an ample supply of natural grazing.



The ration adopted as standard for this test (largely as a result of previous tests) was made up of the following constituents in the proportions shown:—Crushed barley 8, Crushed Wheat 4, Crushed Peas 2, Meatmeal 1, and green feed equivalent to approximately four parts of dry matter. This is referred to below as the “standard ration,” and in those pens which were given a limited supply of food it was fed at the rate of approximately 4½lbs. per day per 100lbs. live weight of the pigs.

The mineral mixture consisted of Charcoal 20 per cent., Salt 20 per cent., Sulphate of Iron 5 per cent., Epsom Salts 5 per cent., Sulphur 5 per cent., Bicarbonate of Soda 5 per cent., Potassium Iodide ¼ per cent., and Bonemeal, Superphosphate or Ground Rock Phosphate 40 per cent. This mixture was added at the rate of 3lbs. per 100 of the grain ration. In the “free choice” pens the various grain constituents of the “standard ration” (and the mineral mixture where given) were placed in separate hoppers of wooden self-feeders, which were replenished frequently so that all the foodstuffs were available to the pigs continuously.

The details of the feeding of the eight pens are given below.

TABLE I.—*Showing the Diet Supplied to Eight Pens of Pigs under Test.*

| Pen No. | Diet.                                                                                                                                  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Standard ration (without mineral mixture).                                                                                             |
| 2       | Standard ration, mineral mixture, Superphosphate.                                                                                      |
| 3       | Standard ration, mineral mixture, Rock Phosphate.                                                                                      |
| 4       | Standard ration, mineral mixture, Bonemeal.                                                                                            |
| 5       | Barley, mineral mixture, Bonemeal.                                                                                                     |
| 6       | Free choice, standard ration constituents (without mineral mixture).                                                                   |
| 7       | Free choice, standard ration constituents Bonemeal mineral mixture (also as “free choice”).                                            |
| 8       | Free choice standard ration constituents, Bonemeal mineral mixture (also as “free choice”), and open grazing in lieu of cut greenfeed. |

From the commencement of the test the pigs in the free choice pens obviously did better than the others, and their average consumption of food was approximately 30 per cent. more. The rate of increase was eventually much greater in these pens than in the others, and these pigs were over fat before the others had reached bacon weight (170lbs. live). At the third weighing, i.e., six weeks from the commencement of the test, the mean weights in the free choice pens were all in excess of 170lbs., and for the purpose of this report the experiment is terminated at that point. The relative rate of fattening increase in each pen is shown in the table below.

TABLE II.—*Relative Rates of Fattening Increase of Pigs Variously Fed over a Period of 42 days.*

| Pen No. | Mean Initial Weight. | Mean Initial Age. | Mean Final Weight. | Highest Individual Fortnightly Gain. | Average Daily Gain in Weight per Pig. |
|---------|----------------------|-------------------|--------------------|--------------------------------------|---------------------------------------|
|         | Lbs.                 | Days.             | Lbs.               | Lbs.                                 | Lbs.                                  |
| 1 ..... | 69.50                | 132               | 135.5              | 28                                   | 1.57                                  |
| 2 ..... | 92.50                | 160               | 167.75             | 31                                   | 1.79                                  |
| 3 ..... | 84.50                | 142               | 151.5              | 35                                   | 1.60                                  |
| 4 ..... | 87.75                | 150               | 155.75             | 30                                   | 1.62                                  |
| 5 ..... | 102.75               | 175               | 165.25             | 28                                   | 1.49                                  |
| 6 ..... | 100.75               | 151               | 184.75             | 38                                   | 2.00                                  |
| 7 ..... | 102.75               | 149               | 193.50             | 36                                   | 2.16                                  |
| 8 ..... | 113.75               | 182               | 189.0              | 32                                   | 1.79                                  |

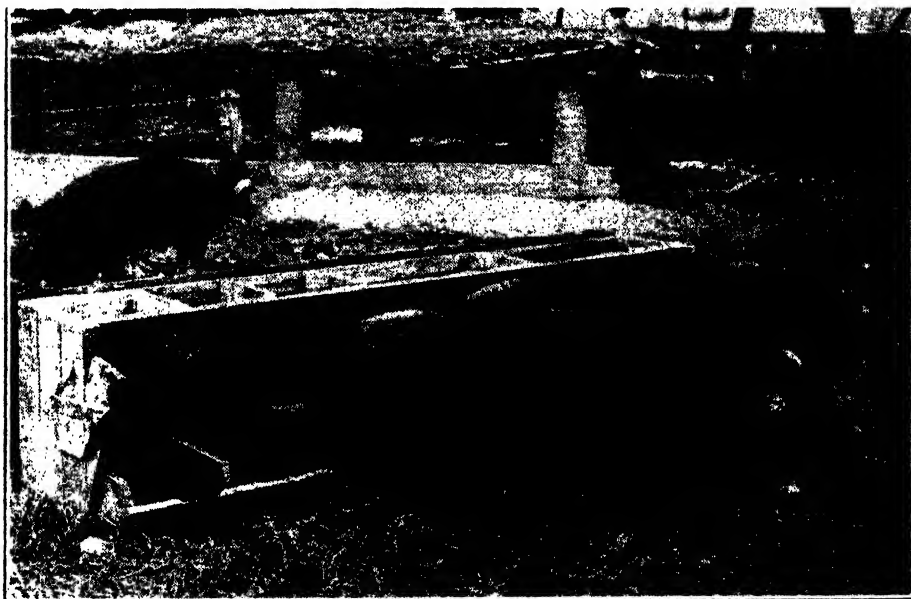
From the above it will be seen that pens receiving the mineral in their grain ration (Nos. 2, 3, and 4) have each shown a more rapid rate of increase than in that deprived of minerals (No. 1).

Similarly, in the free choice pens, No. 7, with access to the mineral mixture, shows a slightly higher rate of increase than No. 6 without minerals.



The differences are small, but the effects might have been more marked if the pigs had come to the test with a low mineral reserve. As a matter of fact, they had previously been fed on a ration containing a full supply of minerals, and deprivation of this supply might have taken a longer period than was covered by the test to produce its full effect.

With regard to the relative effects of superphosphate, ground rock phosphate, and bonemeal (pens 2, 3, and 4 respectively), it will be seen that the pigs receiving superphosphate made a definitely more rapid increase by approximately 11 per cent. It can at least be said then that the superphosphate had no ill-effect, and as it is decidedly cheaper than bonemeal, it can apparently be definitely recommended for incorporation in mineral mixture for pigs.



The Type of Self-feeder used in Pens Nos. 6, 7, and 8.

The single grain ration, barley, in Pen No. 5, gave the lowest rate of fattening increase recorded, 1.49lbs. per day, as against 1.62 in No. 4, the pen receiving mixed grains, but otherwise similarly treated.

In the free choice pens, Nos. 6, 7, and 8, very rapid increases in weight were recorded, averaging approximately 2lbs. per pig per day.

An interesting feature of this test was the marked preference for wheat shown by these pigs. The total quantities of each constituent of the diet taken by each pen are shown in the table below.

TABLE III.—*Showing the Relative Proportions in which Various Constituents of the Diet were Selected by Pigs Fed on the "Free Choice" System.*

| Pen No. | Wheat. | Barley. | Pease. | Meat Meal. | Mineral Mixture. | Greenfeed (equivalent dry matter). | Total. |
|---------|--------|---------|--------|------------|------------------|------------------------------------|--------|
|         | Lbs.   | Lbs.    | Lbs.   | Lbs.       | Lbs.             | Lbs.                               | Lbs.   |
| 6       | 957    | 43      | 64     | 28         | —                | 70                                 | 1,162  |
| 7       | 1,034  | 22      | 180    | 45         | 5                | 70                                 | 1,336  |
| 8       | 875    | 144     | 101    | 9          | 15               | (grazing)                          | 1,144  |

The mean total quantity of food consumed by each pig was 304lbs., whereas each pig of similar weight in the pens receiving a limited ration consumed 231lbs.



A further point of interest shown in the above table is the very low consumption of minerals in both pens which had access to the mixture. This again may be due to the fact, referred to above, that the pigs came to the experiment well provided with minerals from their previous feeding.

Turning now to the economic aspects of the test, calculations have been made of the mean quantities of food consumed in each pen per pound of increase in live weight and the cost of these foodstuffs. These details are shown in the next table. For the purpose of these calculations the following values have been assumed:—Wheat 3s. per bushel, barley 2s. per bushel, pease 5s. per bushel, meat meal 2d. per lb., mineral mixture: bonemeal 11s. 9d. per 100lbs., superphosphate and rock phosphate 8s. 5d. per 100lbs, green feed 10s. per ton, or 30s. per ton of equivalent dry matter.

TABLE IV.—*Showing Mean Daily Consumption of Foodstuffs and Mean Cost per Pound of Increase in Liveweight in Pigs variously Fed.*

| Pen.                                                                                        | Average<br>Daily<br>Increase<br>in Live-<br>weight.<br>Lbs. | Mean<br>Daily Food<br>Consump-<br>tion per<br>Pig (Dry<br>Matter).<br>Lbs. | Mean Cost<br>of Food<br>per Pound.<br>Pence. | Mean Lbs.<br>of Food<br>to 1lb. of<br>Gain.<br>Lbs. | Mean Cost<br>per Lb. of<br>Increase.<br>Pence. |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------------------------|
| No. 1. Mixed grain ration Standard<br>(no minerals).....                                    | 1.57                                                        | 4.78                                                                       | .650                                         | 3.05                                                | 1.98                                           |
| 2. Mixed grain ration Standard,<br>plus Superphosphate<br>mineral mixture .....             | 1.70                                                        | 5.85                                                                       | .620                                         | 3.26                                                | 2.02                                           |
| 3. Mixed grain ration Standard,<br>plus Rock Phosphate<br>mineral mixture .....             | 1.60                                                        | 5.85                                                                       | .620                                         | 3.67                                                | 2.27                                           |
| 4. Mixed grain ration Standard,<br>plus Bone-meal mineral<br>mixture .....                  | 1.62                                                        | 5.85                                                                       | .630                                         | 3.61                                                | 2.28                                           |
| 5. Barley, plus Bone-meal<br>mineral mixture .....                                          | 1.49                                                        | 5.85                                                                       | .486                                         | 3.93                                                | 1.91                                           |
| 6. Free Choice Standard Ration<br>Constituents (no minerals)                                | 2.00                                                        | 6.91                                                                       | .624                                         | 3.46                                                | 2.16                                           |
| 7. Free Choice Standard Ration<br>Constituents, Bone-meal<br>Mineral Mixture .....          | 2.16                                                        | 8.07                                                                       | .678                                         | 3.74                                                | 2.53                                           |
| 8. Free Choice Standard Ration<br>Constituents (open grazing).<br>Bone-meal Mineral Mixture | 1.79                                                        | 7.24                                                                       | .614                                         | 4.03                                                | 2.47                                           |
| Means .....                                                                                 | 1.75                                                        | 6.30                                                                       | .615                                         | 3.59                                                | 2.20                                           |

It will be seen that Pen No. 7, which showed the most rapid increase in live weight, also shows the highest cost of production. The rate of feeding, viz., 8lbs. per day per pig of an average weight of approximately 145lbs. over the whole test, may therefore be regarded as somewhat excessive.

On the other hand, Pen No. 6, with an increased daily consumption of food of over 1lb. per pig per day as compared with Pens Nos. 3 and 4, shows a lower cost of production per pound increase.

Pens Nos. 1 and 5, which show the lowest rates of increase, show also the lowest production costs. This, in the case of Pen No. 5, is, of course, due to the relatively low cost of barley, and in Pen No. 1 the result may have been influenced by the relatively younger age and lower weight of the pigs in this pen. This was an unfortunate discrepancy which seemed inevitable at the time, but resulted in this pen requiring a smaller ration. The pigs were also, no doubt, at a more suitable age than the others for rapid fattening.

The actual results of this test, however, appear to show that:—

1. The feeding of a complex rich diet (as compared with a single grain ration) well provided with minerals, and
2. The supply of an unlimited amount of food,



have each, in turn, been factors in increasing the cost per pound of increase in live weight. This increase in cost, however, is probably offset to some extent by the rapidity of fattening, and it has been shown that mean increases of approximately 2lbs. per pig per day may be achieved by the intensive methods of feeding employed.

Assuming that the normal fattening process for bacon pigs consists of increasing the live weight from 50lbs. to 170lbs., the time required for this, at a rate of 1½lbs. per day, is 80 days, while at 2lbs. per day it is 60 days, and the increased cost (comparing Pens Nos. 5 and 6) is approximately 2s. 6d. per pig. Or, basing calculations upon a comparison of the results in Pens Nos. 2 and 5, a saving of a fortnight in the assumed normal fattening process might be expected at an extra cost of 1s. 1d. per pig.

The shortening of the fattening period represents a quicker turnover and a reduction in general risks, but the value of these advantages depends upon the circumstances in any particular case.

Further, comparing Pens Nos. 5 and 8, the additional cost of 5s. 7d. per pig for food in No. 8 is offset by a fortnight's less fattening time, a reduction in labor for attention by cleaning out once in week in No. 8 as compared with daily cleaning in No. 5, and feeding three times a week instead of twice daily. The labor of cutting and carting green feed is also eliminated and the initial outlay for buildings is less when pigs are run in the open.

#### SUMMARY.

In so far as definite results may be derived from a single test of this sort they appear to be as follows:—

1. Feeding pigs on a rich mixed diet, as indicated above, at the rate of 4½lbs. per day per 100lbs. live weight, with a suitable mineral mixture containing superphosphate and other ingredients as shown in the text may be expected to result in daily increases of up to 1½lbs. per pig per day.
2. The rate of fattening may be increased to 2lbs. per pig per day by supplying 5lbs. to 5½lbs. of food per 100lbs. live weight.
3. The mean rate of consumption of food per pound increase in live weight has been approximately 3½lbs. and the mean cost of producing a gain of 1lb. live weight has been 2½d. on the scale of prices indicated in the text.
4. The addition of the more expensive ingredients of the ration, such as pease and meat meal and the increased rate of feeding have together increased the cost of food by from ½d. to ¾d. per lb. of increase in live weight, but have reduced the time required for fattening by from 16 per cent. to 25 per cent.
5. The system of "free choice" feeding on green pasture, though slightly more expensive so far as food costs are concerned, has a good deal to recommend it, having regard to the quick fattening and the reduction in labor costs and the more simple equipment of building required.
6. Finally, bearing in mind the preferences indicated by the pigs in the free choice pens and the current trend in grain prices, an economical ration for pigs at the present time appears to be a dry crushed mixture of grains in the following proportions:—

|              |         |
|--------------|---------|
| Wheat . . .  | 5 parts |
| Barley . . . | 4 parts |
| Pease . . .  | 1 part  |

Meat meal should be added (in the absence of skim milk) at the rate of 4 parts per 100 of the above mixture and a superphosphate mineral mixture (such as that indicated above) at the rate of 1½lbs. per 100, together with whatever green feed may be available.

#### ERADICATION OF YACCA.

Referring to the experiments with the eradication of Yacca, reported in the January issue, Mr. R. Hill states that on page 635 of that issue the quantities should be 1½ tins instead of 1½galls., as quoted.



## INSECTS OBSERVED ON CROPS IN SOUTH AUSTRALIA DURING PERIOD JUNE, 1928, TO JUNE, 1930.

[By J. DAVIDSON, D.Sc., F.E.S., Waite Agricultural Research Institute,  
University of Adelaide.]

The following observations on insects found associated with agricultural and horticultural crops in South Australia form the first of a series of records which will be published annually or biennially in future years. With the present list it is not intended to include all the species known to be harmful to crops in the State. The definite determination of the species concerned has not been possible in some cases and such records are omitted. Additions will be given in later reports.

It is hoped that in this way a complete record of the occurrence of insect pests of crops in the State eventually will be obtained. The value of the records will depend upon adequate systematic observations being made, so that after a lapse of years the occurrence of important pests during different periods will be available for comparison. With the active co-operation of the officers of the Department of Agriculture such records are assured and valuable data will be accumulated. The relationship between weather conditions and outbreaks of insect pests is a question of great importance in agricultural entomology and systematic records over a series of years are necessary before any serious attempt can be made to interpret this relationship. Detailed records of the behavior of the more important insect pests from year to year will yield important information regarding the distribution and seasonal prevalence of these insects.

The recorded notes on the different species are necessarily brief in the present summary. Modifications may be made in later reports so as to include new observations of interest to growers and any special new features regarding control measures. It is felt, however, that it is best to defer this until a more complete list of the economic insects of the State has been obtained.

Owing to climatic differences in various regions of the State, chiefly due to altitude and rainfall, it is considered desirable to make references in many cases to the particular districts to which the records refer. In the case of horticultural crops the seven districts referred to in the annual report of the Chief Horticultural Instructor, dated October 16th, 1929, and September 26th, 1930, are used for convenience.

Sincere thanks are due to the Director and staff of the Department of Agriculture for the helpful assistance they have afforded me in many ways. The active interest taken in the matter by Mr. G. Quinn, Chief Horticultural Instructor, and his field officers has been invaluable. The observations on insect pests contained in the periodical reports of the horticultural instructors in the various districts have formed the basis of the present survey.

Thanks are also due to Mr. A. M. Lea, Entomologist at the Adelaide Museum, for his unfailing courtesy and assistance in identification of specimens.

### I. CEREAL CROPS.

"White grubs" (*Scarabaeidae*) caused damage in small areas to oats and barley in Yorke Peninsula during spring of 1929. (See Davidson, J., *Journ. Agric.*, South Australia, 1930, vol. 34, p. 224).

The weevil (*Polyphrades lactus* Black.) was recorded as feeding on wheat plants in the Talia district in September, 1929.

The oat eelworm (*Heterodera schachtii* Schm.) occurred on roots of wheat, oats, and barley in several districts during the winter months in both years. These nematodes cause an abnormal development of the roots, particularly of young plants, growth being checked. (See J. Davidson, 1930, *Journ. Agric.*, South Australia, vol. 34, 378-385, and A. R. Hickinbotham, vol. 34, 386-392).



## II. PASTURE AND FORAGE CROPS.

The clover springtail or lucerne flea (*Sminthurus viridis* Linn.) is a serious pest of lucerne on the irrigation flats in the Murray Bridge district during May to October. It also occurs widely throughout the better rainfall areas of the State, especially on Subterranean clover (*Trifolium subterraneum*) and lucerne. It is also common on many garden plants and weeds, particularly the introduced Cape weed (*Cryptostemma calendulaceum*). "White grubs" were prevalent in pasture areas in the South-East during spring of 1928 and 1929. The boll worm (*Heliothis obsoleta* Fabr.) occurred on lucerne in early summer in 1929 and 1930 in Mid-northern districts. (See paper by A. M. Lea, *Journ. Agric.*, South Australia, 1928, vol. 31, pp. 608-615). The blue Lycaenid butterfly (*Zizania labradus* Godart) was present in large numbers in lucerne areas at Booborowie (Mid-northern district) during February, 1930. In some cases the larvae had eaten into the base at the flowers, which consequently failed to set seed pods.

The red-legged earthmite (*Penthalcus destructor* Jack) was present in the Riverton district in a local garden in July, 1928 and 1929, but did not occur in a serious epidemic form. It occurs in other areas of the State. (See W. C. Johnston, *Journ. Agric.*, South Australia, 1930, vol. 34, p. 283). The correct name of this pest is stated to be *Halodystaeus destructor* Tucker. (See *Journ. Comm. Council Sci. Ind. Res.*, 1930, vol. 3, p. 190).

## III. FIELD AND MARKET GARDEN CROPS.

The potato moth (*Plutomaea operculella* Zeller) was active in Mount Gambier area and Glencoe during March and April, 1929, being also severe in Southern districts. Cut worms (*Agrotis munda* Walk.) caused damage to roots of strawberry plants in the Adelaide hills, and also "white grubs." Commercial naphthalene worked into the soil between the rows at the rate of 3ozs. per square yard gave relief. The cauliflower riddler (*Plutella maculipennis* Curt. (*P. cruciferarum* Zell.) caused damage to cabbage and cauliflower in Southern districts. The boll worm (*Heliothis obsoleta* Fabr.) occurred on tomatoes in the Mount Lofty district during November, 1928, and in Southern districts during March and November, the larvae eating into the fruit.

The tomato weevil (*Desiantha nociva* Lea.) occurred on tomatoes in Adelaide district during October and November, 1929, and the cockchafer beetle (*Isodon pecuarius*) was found eating tips of tomato plants at Port Pirie in October, 1929. The banded pumpkin beetle (*Aulacophora hilaris* Boisd.) was active in some gardens on the Adelaide plains in November, 1929. The black carnation thrip (*Frankliniella insularis* Franklin) occurs on tomato plants and on the flowers of many other plants during summer. (See J. Davidson and J. G. Bald, *Bull. Entom. Research*, 1930, vol. 21, pp. 365-385). This insect does not directly damage the tomato plant, but it has been shown under experimental conditions that the species can transmit spotted wilt disease of tomatoes, and is therefore to be considered as an important pest. (See G. Samuel, J. G. Bald, and H. A. Pittman, *Com. Council Sci. Ind. Res.*, 1930, *Bull. No. 44*). The mite (*Phyllocoptes lycopersici* Tryon) occurs on tomato plants, causing a brown discoloration of the stem and leaves. White fly (*Trialeurodes vaporariorum* Westwd.) was troublesome in tomato glasshouses in districts round Adelaide in both years.

*Aphides*.—The strawberry aphid (*Capitophorus fragariae* Theob.) was recorded from strawberries in the Mount Lofty district in March, 1929, but disappeared by the end of April. The parsnip aphid (*Cavariella pastinacae* Linn.) and also (*C. aegopodii* Scop.) were recorded from parsnips in the Mount Lofty area and on Adelaide plains during November and December, 1929. The green peach aphid (*Mysus persicae* Sulzer) occurred on cabbages, cauliflowers, and swedes in Southern districts and Adelaide plains, also on Mount Lofty ranges. The cabbage aphid (*Brevicoryne brassicae* Linn.) was also prevalent on cabbage in several districts. The black bean aphid (*A. rumicis* Linn.) occurred in November, 1929, in South-East and also Southern districts. A



subterranean aphid occurred in large numbers on rhubarb and roots of *Chenopodium* sp. in Basket Range in October, 1929. It appears to be the same as *Pemphigus betae* Doane or a closely allied species.

The bulb mite (*Rhizoglyphus hyacinthi* Banks) was found infesting bulbs in Mount Lofty district.

#### IV. FRUIT CROPS AND VINES.

Codlin moth (*Cydia pomonella* Linn.) was severe in some districts on apples during February and March, 1929. Observations on captures in bait traps by Mr. J. B. Harris in the Northern districts showed that the first big flight occurred in that district during first week in November, as was the case in the three previous years. There are two full broods and may be a partial third brood. Late attacks in March, 1929, were noted in some orchards in Southern districts. Pears were reported to be slightly attacked in some orchards in Adelaide plains and more severely in the Lower Murray Valley. A small attack on walnuts was recorded in the Southern district in March, 1929. Mr. R. Fowler (Bull. No. 243, Dept. Agric., S. Australia, 1930) has given the results of experimental tests carried out at the Blackwood Experimental Orchard.

The light brown apple moth (*Tortrix postvittana* Walk.) was present in normal numbers during November, 1929, in Northern and Central districts.

The boll worm (*Heliothis obsoleta* Fabr.) was found boring into young apples at Brighton at end of November, 1929, and also eating the tips of young shoots, doing considerable damage. Apricots and plums were similarly attacked.

The apricot borer (*Cryptophaga unipunctata* Donovan) was observed in November, 1929, in Southern districts. The vine moth (*Agarista glycoine* Linn.) was prevalent in April, 1929, in South-Eastern district. The orange butterfly (*Papilio anactus* Macleay) occurred in fair numbers at Mypolonga during March, 1930.

The cherry and pear slug (*Caliroa cerasi* Linn.) was severe on pears in March and December, 1929, in Southern districts, and active on pear and hawthorn the following month on the Adelaide plains.

The apple root borer (*Leptops rhizophagus* Lea) has caused considerable damage in apple orchards in the Wirrabara district, and *L. robustus* Oliv. is present in some orchards in the Mount Lofty ranges.

The curculio beetle (*Otiorhynchus cribricollis* Gyll.), a general feeder on foliage and twigs of fruit trees, was much in evidence during March, 1929, in South-East, Central, and Southern districts. It caused much damage in the latter district in February, 1930. In December, 1929, an area of young vines near Adelaide was severely attacked. (See paper by A. M. Lea, *Journ. Agr.*, South Australia, 1927, vol. 30, pp. 582-598). A flight of cockchafers (*Heteronyx* sp.) occurred on an acre of two year old vines near Angaston in October, 1929, causing much damage. An outbreak of the bug (*Oxycarenus lactuosus* Mont. et Sign.) occurred at Greenock in January, 1929, the pest swarming over an area of young vines.

*Aphides*.—The green peach aphid (*Myzus persicae* Sulzer) was unusually severe in early summer of 1928 and caused much damage to peach, apricot, and nectarine trees. The damage was not so serious in 1929. This pest lives on a wide range of plants throughout the year, and only a few sexual forms have been observed on the orchard trees in the autumn. A few sexual females were found on peach trees at Blackwood State Orchard on May 8th, 1929, and stem females from the eggs were found about the middle of the following September. (See experiments by R. Fowler, *Journ. Agr.*, South Australia, 1930, vol. 34, pp. 62-63).

The black peach aphid (*Anuraphis persicae-niger* Smith) was particularly prevalent in some districts in 1928, but occurred only in normal numbers during 1929. The species is readily controlled with insecticides.

The pear root aphid (*Eriosoma lanuginosum* Htg.) caused the loss of some nursery pear stocks at Balhannah. It occurs on roots of established pear trees in some orchards in Adelaide hills. (See Davidson, J., *Journal of Agriculture*, South Australia



1929, vol. 32, p. 798). The woolly apple aphid (*Eriosoma lanigerum* Hausm.) is generally distributed. It was particularly noted in orchards in Mount Lofty ranges and Southern districts in March, 1929, and again during August to December, but was checked by heat in January. *Aphelinus mali* Hald., which has now been distributed to various districts from Blackwood Experimental Orchard chiefly through the active interest of Mr. R. Fowler, the Manager, is becoming established in certain districts. It is in evidence in orchards at Kangarilla, in the Coromandel Valley, and some orchards in the Adelaide hills. In April, 1929, it appeared to be established at Kybybolite.

The black cherry aphid (*Myzus cerasi* Fab.) was prevalent in the Millicent district in December, 1929, but the attack was checked by the heat in January.

The melon aphid (*Aphis gossypii* Glov.) occurred in numbers on apricots and nectarines in a garden at Brighton in December, 1929, being present also on a wide range of plants, including *Vicia calcarata*, *V. tetrasperma*, and Penstemons.

The orange aphid (*Aphis tavarasi* Del Guere) was noted in Southern districts in November, 1929. *Toxoptera aurantii* Koch. also occurred in small colonies on orange and lemon trees.

*Scale Insects* (Coccidae).—Scale insects on citrus, chiefly Red scale, are controlled by means of the efficient organisation of the Horticultural Department for fumigating infested areas. (See article by C. H. Beaumont, *Journ. Agric.*, South Australia, 1930, vol. 33, pp. 618-624).

The dark-brown olive scale (*Saissetia oleae* Bernard) was more prevalent than usual in 1929 on Adelaide plains. It was present to a less extent in Southern districts.

Red scale (*Chrysomphalus aurantii* Maskell) occurs in the Adelaide area. It was found in one orchard at Berri in September, 1929, and also noted on two properties at Renmark in April, 1930. The parasite *Aphelinus diaspidis* Howard was recorded as parasitising red scale freely in an orchard at Yankalilla in 1928.

The black scale (*Chrysomphalus rossi* Maskell) was noted on the lower Murray in July, 1929, and at Waikerie in May, 1930. In November, 1929, it occurred in Northern districts where it is not usually found.

The soft brown scale (*Lecanium hesperidum* Linn.) was noted on orange trees at Gawler in November, 1929. (See note in *Journ. Agr.*, South Australia, 1929, vol. 33, p. 328).

Mussel scale (*Lepidosaphes ulmi* Linn.) occurred on old apple trees in Mount Gambier district.

Red spider (*Tetranychus* sp.) and red mite (*Bryobia* sp.) caused damage in several districts, particularly on almonds, prunes, and plums.

The dried fruit moth *Plodia interpunctella* Hb. occurs as a serious pest of dried grapes after they are packed. (See J. G. Myers, Publication, Empire Marketing Board, No. 12, London, November, 1928, 36 pp.) The parasite *Habrobracon juglandis* Ashm. has been found associated with the pest attacking the larvae. (See H. Showell, *Journ. Agric.*, South Australia, 1928, vol. 31, pp. 1048-1056). *Ephestia cautella* Walk. has been observed in grape drying areas.

#### V. MISCELLANEOUS OBSERVATIONS.

Larvae of the sheep nostril fly (*Oestrus ovis* Linn.) were recorded from the heads of two wethers at Ramco in April, 1929.

The larvae of *Ohlenias pini* Tindale (Fam. Boarmidae) caused damage in plantations of *Pinus insignis* at Mount Burr in the South-East in the spring of 1928, but did not occur as a pest the following year. (See N. B. Tindale, Records of South Australian Museum, 1928, vol. 4, pp. 43-48.)

Cutworms caused much damage to seedlings of *Pinus insignis* at Kuitpo Forest in October, 1928, the seedlings being eaten off at ground level. In December, 1929, older seedlings were also attacked at Happy Valley nursery, the tips of the plants being eaten off.



Larvae of the tiger moth (*Ardices gletigyni* Le Guil.) occurred in large numbers in spring of 1929 in Brighton area; they are destructive general feeders. The case moth (*Thyridopteryx herrichi* Westwd. caused much damage in a young plantation of *Eucalyptus gomphocephala* at Streaky Bay in March, 1929. The seedling gum moth (*Nola metallopa* Walk.) was very active on young gum trees in Adelaide foot hills. The larvae of a small moth (*Musotima ochropteralis* Guenee\*) caused serious damage to maiden-hair ferns in a small fern house near Adelaide. The caterpillars were present in large numbers, eating the foliage and rolling portions of the leaves in which they pupated. The borer (*Cryptophagus unipunctata* Donovan) caused damage to swamp oaks at Port Pirie. A number of larvae of the moth *Stericta costigeralis* Walk.\* were found on a dry broom fence at Murray Bridge on October 7th, 1929. They lived on this dry material in a cardboard box, eventually pupating in a silken case covering themselves with frass and pieces of dried plant. Two moths emerged on December 17th. Larvae found feeding on dried herbarium specimens at Murray Bridge High School proved to be the dried fruit moth (*Plodia interpunctella* Hub.), an unusual habitat for this moth.

The Cottony cushion scale (*Icerya purchasi* Maskell) occurred in Southern districts and in the Upper Murray district in July, 1929, but only in small colonies. The red bug (*Dindymus versicolor* H. Sch.) and the crusader bug (*Mictis profana* Fabr.) commonly occur on citrus trees, but no case of serious damage has been observed.

The green cockchafer (*Diplucephala colaspidoides* Gyll.) swarmed on young wattles in Southern districts in October, 1929. This species may on occasions attack fruit trees. Grubs of a weevil (*Balaninus* sp.) were found in a sample of acorns imported from Turkey for tanning purposes in March, 1929.

Two species of beetles (*Aphodius ambiguus* Boli and *Psummodius obscurior* Bl.) were received from Port Pirie district, it being stated they were damaging pea plants. This association, however, was doubtless only a chance one and they were not the cause of the damage. *Lagria grandis* Gyll. was common in the Southern districts. This species sometimes attacks soft fruits, but cannot be considered as a pest.

The longicorn (*Symphyletes deopicius* Pasc.) was found affecting roses in the Brighton district in June, 1929, and also at Blackwood.

The stag beetle (*Lamprina* sp.) was observed eating leaves of apricot tree near Brighton in December, 1929.

A sporadic swarm of the minute Collembolan (*Proisotoma minuta* Schott.) occurred in a tomato glasshouse near Adelaide on June 26th, 1929. The insects congregated in depressions of the soil, forming masses about 4in. wide by ½in. to ¾in. deep. The species is stated to damage seedlings, but no damage could be ascribed to them on this occasion, and they disappeared after a few days.

\*Identified by Mr. N. B. Tindale.

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## SUMMARY OF PLANT DISEASE RECORDS IN SOUTH AUSTRALIA FOR THE TWO YEARS ENDING JUNE 30TH, 1930.

[By G. SAMUEL, M.Sc., Waite Agricultural Research Institute, University of Adelaide.]

The rather dry conditions experienced during the two years did not favor the development of fungus diseases.

**CEREALS.**—There was very little loss from Take-all (*Ophiobolus graminis*) either year. Foot-rots caused by *Fusarium culmorum* and *Helminthosporium sativum* were determined, but were not widely distributed. Leaf Rust (*Puccinia triticina*) was rather prevalent, especially in 1928, but Stem Rust (*Puccinia graminis*) was of little importance, although slightly more prevalent than usual in 1928. Flag Smut (*Urocystis tritici*) is present annually in certain districts. Bunt (*Tilletia tritici*) was very scarce in 1928, but rather prevalent in 1929.

A seedling disease of wheat and oats (see *Journal of Agriculture*, S. Aus., 32, 40-43, three figs. (1928)), apparently caused by a species of *Rhizoctonia*, was determined from several localities in the mallee districts. The disease usually occurs only in small patches, in which the seedlings are stunted and later die.

Manganese deficiency disease of oats and barley seems to be somewhat more severe in dry seasons than in wet, on the special types of soil on which it has been found to occur.

**FIELD CROPS.**—Peas, grown in rotation with wheat, suffer in some localities from a collar rot due to an undetermined fungus. Downy Mildew of peas (*Peronospora viciae*), and of lucerne (*Peronospora trifoliorum*) were recorded for the first time, and also a wilt of lucerne due to *Sclerotinia* sp.

**TOMATOES.**—Spotted wilt (virus) was very prevalent in outdoor crops in 1928-9, but less so in 1929-30. In many cases it has caused considerable losses of young seedlings in glasshouses also. Streak (virus), and root-rots, in which *Verticillium albo-atrum* and *Colletotrichum atramentarium* appear to be the most important fungi concerned, are present every year in a proportion of the glasshouse. Early Blight of the leaves (*Macrosporium solani*) and a leaf blight apparently caused by a species of *Pleospora* very closely related to, if not identical with, *Pleospora herbarum*, were noted in a few cases.

A browning of leaves and stems due to a surface-feeding mite (*Phyllocoptes lycoopersici*) was also noted, both on outdoor crops and in glasshouses, but was not general.

**VEGETABLES.**—Turnip mosaic and pink root of onions were present in certain districts. Silver Scurf of potatoes (*Spondylocladium atrovirens*), Downy Mildew of lettuce (*Bremia lactucae*), Leaf blight of carrot seedlings (*Macrosporium carotae*), a *Botrytis* neck-rot of onions, and a bacterial spot of beans, probably due to *Phytomonas medicaginis*, var. *phaseolicola*, were recorded for the first time.

**FRUIT AND VINES.**—A number of cases of injury among vines and fruit trees, especially stone fruits and citrus, occurred during the last two years as a result of increase in the salt concentration in the soil following the run of dry seasons experienced lately. Powdery Mildew (*Sphaerotheca pannosa*) was noted for the first time, causing a mildew of apricot and peach fruits in two cases on single trees. Black Rot (*Physalospora cydoniae*) caused severe limb cankers on apples in one orchard. Downy Mildew of vines (*Plasmopara viticola*), which was recorded some years ago, has not been seen during the last three years. A case of Scaly Bark (*Psorosis*) of citrus was recorded for the first time.

**ORNAMENTAL PLANTS.**—A yellows disease of Iceland poppies (virus) was fairly prevalent in suburban gardens. Shot hole of Antirrhinum (*Heteropatella antirrhini*, conidial stage), a leaf spot of linden (*Gloeosporium tiliae*) and a powdery mildew (*Oidium*) on nursery stock of *Eucalyptus cornuta* were noted for the first time.



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## POSSIBILITIES OF THE POULTRY INDUSTRY.

[By C. F. ANDERSON, Government Poultry Expert.]

The production of poultry and eggs is, at the present time, showing rapid expansion. For a number of years persons engaged in this form of production were rather scorned at, but during the last ten years the poultry industry has gradually forged its way to the front, until to-day it is an industry that lends itself particularly to great expansion, especially in view of the present values of wheat and its by-products.

When it is understood that the Australian, and particularly the South Australian, White Leghorn is pre-eminent in the world as an egg-producer, it can readily be seen what a wonderful asset the fowl is to South Australia, and the opportunity it offers for future expansion. Our somewhat despised White Leghorn hen of an average weight of 4lbs. produces on the average of 14 dozen eggs a year, equivalent in weight of 21lbs., or, in other words, she produces five-times her own weight in eggs.

In stressing the possibilities of the poultry industry, figures supplied by the Government Statistician for the year ending June, 1930, show that the value of the industry to South Australia on present-day values is £950,542, and the total numbers of poultry, ducks, geese, and turkeys existent in the State as on June 30th, 1930, were as follows:—

|                  |           |
|------------------|-----------|
| Fowls .. . . .   | 1,552,760 |
| Ducks .. . . .   | 50,102    |
| Geese .. . . .   | 16,555    |
| Turkeys .. . . . | 46,401    |

or, a total of . . . . . 1,665,818 head

These figures offer more room for thought in the direction of the food consumed, and which is produced in our own State. It can be taken as a reasonable basis that each head of poultry, ducks, geese, turkeys, &c., consume 4ozs. of wheat per day per bird—whether in the form of wheat, or its by-products of bran and pollard—equivalent to approximately 2,500,000bush. of wheat per year.

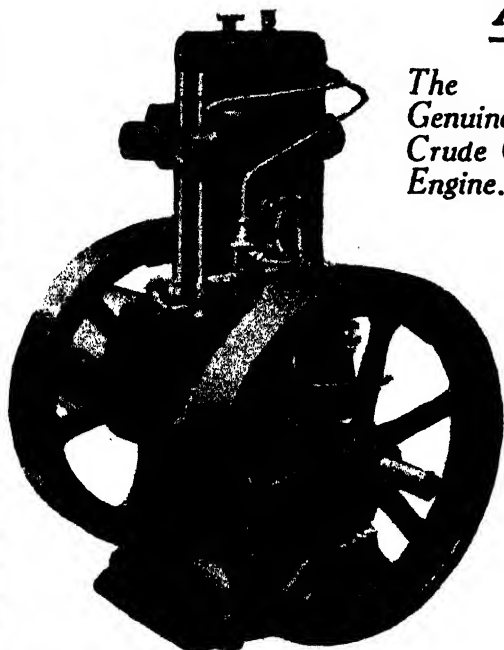
During the present times, business men are naturally looking for primary production which is going to bring the most finance into the country, and it is in this direction that poultry production is eminently suited. Taking the average price of wheat to-day on the farm at 2s. per bushel—a very liberal estimate—has it ever occurred to commercial men that the conversion of this wheat into eggs would return 10s. per bushel? This estimate has been arrived at from long practical experience as a poultryman and as one who has been actively connected with the marketing of eggs. The average consumption of wheat per fowl can be taken as 1½bush. per year, equivalent at present-day values to 3s. The average production of a flock of high class White Leghorns can be put down at 12 dozen eggs per year, and taking present-day value of this class of egg at 10d. per dozen—which is a very conservative estimate—this production is equivalent to a return of 10s. for each 3s. worth of wheat fed to the fowl. These figures should give thought for serious consideration. I know that in past years the poultry industry has been to a certain extent “looked down on,” but, personally, I have never wavered in my opinion that our poultry industry is destined to be one of our greatest primary industries.



In support of this conclusion, I draw attention to the rapid growth of the exports of eggs overseas. Any advancement in our primary industries is usually judged by our exports, and in this direction the poultry industry compares more than favorably with any other line of primary production. Five years ago the exports of eggs from Australia were practically negligible. For the past season, concluded in December of last year, nearly 200,000 cases of eggs—each containing 30 dozen—were shipped from Australia. South Australia's share of this total was 25,000 cases, which was just double the quantity of eggs shipped in the previous year—which was then a record year. In other words, our previous record exports were doubled in one season. If our other primary industries had made similar advancement to that made by the poultry industry during recent years, we would not find ourselves in our present unfortunate position. The 25,000 cases of eggs exported from South Australia during the season just concluded were valued at £50,000, and the total exports of eggs from Australia for a similar period were valued at £430,000.

In addition to the overseas exports, South Australia is a large exporter of both eggs in the shell and egg pulp to the eastern States, the value of which is estimated at £150,000 per year.

With regard to the production of poultry and eggs, either as a side line or solely as a means of livelihood, South Australia is fortunately situated. We have one of the finest climates in the world, both for the rearing and production of poultry; our utility strains of poultry are unequalled in any country; we have all the necessary foodstuffs practically at our door; it is not necessary for one penny to go out of the State either for plant, equipment, stock, or food, and above all other considerations, we have a payable export Empire trade for all the eggs we are likely to produce in this country for generations to follow.



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## ROSEWORTHY AGRICULTURAL COLLEGE.

## HARVEST REPORT, 1930-31.

[By W. R. BIRKS, B.Sc. (Agric.), Principal; T. A. COLE, D.D.A., Experimentalist; and L. W. BEAUMONT, R.D.A., Farm Superintendent.]

The season under review is the fourth in succession in which drought conditions have prevailed more or less. After the previous dry years and with practically no effective rains early in this season, it seemed reasonable to anticipate a break in the run of unfavorable conditions and a larger area than usual was sown. The rainfall for the year, however, amounted to only 12.85in., or 4.80in. below normal; only three other seasons since 1904 have been drier, viz., those of 1914, 1918, and 1919. The useful rain was 11.77in., and in the period referred to there have been seven seasons with less. The worst feature of the distribution of this season's rainfall, however, was the light and scattered nature of the September falls, which amounted to less than half the normal. Ultimately about a quarter of the area sown failed, or at least gave yields which, even in the past, have been regarded as unremunerative, and all average crop returns were below normal. Nevertheless, on certain areas of well worked fallow quite satisfactory yields were recorded—up to approximately nine bags of wheat, 12 bags of oats, and 2½ tons of hay per acre. In the aggregate, too, the grain yield of 3,267 bags in all, hay return 180 tons, and ensilage 286 tons, together represent the best harvest which has been taken from the College farm since 1925.

In the table below are shown the figures summarising the gross returns for the year and those giving the comparison between this year's average yields and the means of previous years:—

TABLE I.—*Showing Crop Returns for 1930, and Average Yields per Acre in Comparison with Mean Yields.*

| Crop.          | 1930 Harvest. |                  | Mean Yields. |            |
|----------------|---------------|------------------|--------------|------------|
|                | Total Yield.  | Average Yield.   | Period.      | Bush. Lbs. |
| Wheat .....    | Bush. 4,718   | Bush. Lbs. 15 24 | 1904-30      | 17 1       |
| Oats .....     | 3,757         | 16 26            | 1905-30      | 23 6       |
| Barley .....   | 969           | 16 48            | 1904-30      | 24 38      |
| Pease .....    | 357           | 5 25             | 1916-30      | 9 50       |
|                | Tons          | T. c. lbs.       |              | T. c. lbs. |
| Hay .....      | 179           | 1 0 96           | 1904-30      | 1 18 48    |
| Ensilage ..... | 286           | 2 0 16           | 1905-30      | 5 18 7     |

## WEATHER AND RAINFALL.

The first half of the year was practically devoid of useful rain. Until towards the end of June there had occurred only two rains which were, at all useful for germinating either weeds or crop. By that time all seeding, with the exception of the major part of the wheat, was completed. Some of the crops were therefore infested with weeds and were further handicapped by the slow start. Oats, which germinated in the last week in April, remained practically stationary in growth for two months. Germination in the early sown crops was irregular and what growth occurred was stunted owing to the dry cold conditions of June. Twelve frosts were recorded in that month, while the rainfall for the half-year had been 2½in. as compared with the normal—7½in.



July, on the other hand, was wetter than usual, free from frost, and provided unusually favorable conditions for growth. These conditions persisted for the first three weeks of August. All crops made rapid headway, and a bounteous harvest seemed assured if subsequent rainfall had been but normal. From August 22nd, however, there followed a period of seven weeks, during which showers were frequent, but almost all too light to be of any service to the crops which "went back" rapidly, especially those sown on stubble land. It was not until the fourth week of October that definite relief came in falls totalling 2½ in. of rain. By this time some 200 acres of the oat crops sown on stubble land had ripened off prematurely and may be regarded as having failed. All crops on fallow were, however, enabled to mature, and about half the area sown still seemed capable of returning much above average yields. Two further setbacks occurred, however, in November. On the 3rd and 4th the worst of a series of gales occurred. This did serious damage to the ripening oats and barley, which suffered to the extent of 10 bush. per acre, or more in some cases. The wheat, being later, escaped the thrashing effects of the gales, but as no further rain of importance occurred during November the heads did not fill out normally, and the grain was more or less shrivelled and yields reduced in consequence. This effect was accentuated to a certain extent by light attacks of rust, favored by the frequent showers throughout the spring.

Finally, weather conditions for harvesting were favorable, with one short break early in December, and the crops were taken off without serious interruption or further loss.

The details of weather conditions and rainfall are shown in the tables below, together with certain records of previous seasons:—

TABLE II.—*Showing the Annual Rainfall at Roseworthy College, together with the "Useful Rainfall" and the Percentage of "Useful" to Total Rainfall, the Total "Fallow Rainfall," and the Means for the Seasons 1904-30.*

| Year.       | Total Rainfall. | "Useful" Rain,<br>April 1st to<br>November 30th. | Percentage<br>"Useful" to<br>Total Rain. | Fallow Rain,<br>Previous<br>August 1st<br>to<br>March 31st. |
|-------------|-----------------|--------------------------------------------------|------------------------------------------|-------------------------------------------------------------|
|             | In.             | In.                                              | %                                        | In.                                                         |
| 1904 .....  | 14.70           | 11.60                                            | 79                                       | 11.16                                                       |
| 1905 .....  | 16.71           | 14.23                                            | 85                                       | 7.18                                                        |
| 1906 .....  | 19.73           | 16.31                                            | 83                                       | 7.96                                                        |
| 1907 .....  | 15.13           | 13.96                                            | 92                                       | 11.29                                                       |
| 1908 .....  | 17.75           | 15.52                                            | 87                                       | 9.13                                                        |
| 1909 .....  | 24.05           | 21.15                                            | 88                                       | 9.51                                                        |
| 1910 .....  | 23.87           | 16.79                                            | 70                                       | 17.56                                                       |
| 1911 .....  | 13.68           | 9.45                                             | 69                                       | 11.41                                                       |
| 1912 .....  | 14.97           | 13.05                                            | 87                                       | 5.88                                                        |
| 1913 .....  | 15.66           | 10.82                                            | 69                                       | 13.00                                                       |
| 1914 .....  | 9.36            | 6.12                                             | 65                                       | 13.07                                                       |
| 1915 .....  | 19.76           | 18.33                                            | 93                                       | 3.86                                                        |
| 1916 .....  | 23.23           | 20.25                                            | 87                                       | 9.08                                                        |
| 1917 .....  | 21.86           | 17.25                                            | 79                                       | 14.79                                                       |
| 1918 .....  | 12.01           | 10.53                                            | 88                                       | 10.83                                                       |
| 1919 .....  | 12.38           | 8.21                                             | 66                                       | 7.45                                                        |
| 1920 .....  | 19.30           | 16.76                                            | 87                                       | 7.27                                                        |
| 1921 .....  | 17.16           | 12.98                                            | 76                                       | 13.78                                                       |
| 1922 .....  | 20.00           | 14.90                                            | 75                                       | 7.51                                                        |
| 1923 .....  | 27.46           | 25.30                                            | 92                                       | 9.32                                                        |
| 1924 .....  | 20.43           | 16.08                                            | 79                                       | 15.23                                                       |
| 1925 .....  | 15.65           | 14.18                                            | 91                                       | 11.48                                                       |
| 1926 .....  | 18.49           | 16.63                                            | 90                                       | 8.33                                                        |
| 1927 .....  | 14.59           | 11.73                                            | 80                                       | 11.08                                                       |
| 1928 .....  | 18.03           | 11.85                                            | 66                                       | 12.40                                                       |
| 1929 .....  | 13.06           | 9.73                                             | 75                                       | 5.22                                                        |
| 1930 .....  | 12.85           | 11.77                                            | 92                                       | 8.61                                                        |
| Means ..... | 17.48           | 14.28                                            | 81                                       | 10.13                                                       |



TABLE III.—*Showing Distribution of Rainfall by Months for the Seasons 1921-1930, together with the Mean Fall for each Month of the Period 1904-30.*

|         | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---------|------|------|------|--------|------|-------|-------|------|-------|------|------|------|
| 1921 .. | 1.80 | 0.52 | 1.01 | 0.20   | 2.94 | 1.95  | 1.43  | 1.21 | 2.04  | 1.56 | 1.65 | 0.85 |
| 1922 .. | 1.02 | 0.08 | 0.10 | 0.90   | 3.59 | 1.73  | 3.75  | 2.19 | 1.32  | 1.40 | 0.02 | 3.90 |
| 1923 .. | 0.47 | —    | 0.02 | 0.10   | 6.01 | 5.03  | 4.48  | 2.42 | 4.73  | 2.17 | 0.36 | 1.67 |
| 1924 .. | 0.92 | 1.82 | 1.14 | 1.02   | 2.26 | 2.72  | 0.41  | 2.08 | 2.59  | 2.45 | 2.55 | 0.47 |
| 1925 .. | 0.38 | 0.66 | 0.30 | 1.25   | 2.41 | 1.37  | 2.24  | 1.51 | 4.17  | 0.95 | 0.28 | 0.13 |
| 1926 .. | 0.01 | 0.75 | 0.57 | 1.70   | 2.61 | 1.67  | 2.03  | 3.48 | 2.06  | 2.17 | 0.91 | 0.53 |
| 1927 .. | 0.37 | 0.70 | 0.86 | 0.22   | 1.81 | 1.29  | 2.91  | 2.24 | 1.22  | 0.36 | 1.68 | 0.93 |
| 1928 .. | 1.58 | 3.29 | 1.10 | 0.80   | 2.01 | 3.30  | 1.55  | 0.52 | 1.31  | 2.22 | 0.14 | 0.21 |
| 1929 .. | 0.29 | 0.36 | 0.17 | 0.42   | 0.93 | 1.54  | 1.07  | 1.62 | 1.90  | 0.76 | 1.49 | 2.51 |
| 1930 .. | 0.02 | 0.30 | 0.01 | 0.89   | 0.74 | 0.77  | 2.50  | 2.06 | 1.01  | 3.21 | 0.59 | 0.75 |
| Means   |      |      |      |        |      |       |       |      |       |      |      |      |
| 1904-30 | 0.66 | 0.80 | 0.84 | 0.96   | 2.14 | 2.26  | 1.97  | 2.05 | 2.03  | 1.77 | 1.11 | 0.90 |

TABLE IV.—*Showing Details of Weather for 1930.*

| Month.      | Rainfall. | No. of Days on which Rain fell. | Important Rains. |      | Minimum Temp. | Mean Min. Temp. | Frosts. |       | Maximum Temp. | Mean Max. Temp. |
|-------------|-----------|---------------------------------|------------------|------|---------------|-----------------|---------|-------|---------------|-----------------|
|             |           |                                 | Date.            | In.  |               |                 | Date.   | Temp. |               |                 |
| January .   | In. 0.02  | 1                               |                  | —    | 48.0          | 57.89           | —       | —     | 107.0         | 84.66           |
| February .  | 0.30      | 5                               | 21               | 0.25 | 48.0          | 63.93           | —       | —     | 109.0         | 91.91           |
| March ....  | 0.01      | 4                               | —                | —    | 45.0          | 58.29           | —       | —     | 104.0         | 85.34           |
| April ..... | 0.69      | 12                              | 23               | 0.17 | 41.5          | 52.75           | —       | —     | 89.5          | 74.45           |
|             |           |                                 | 24               | 0.29 |               |                 |         |       |               |                 |
| May .....   | 0.74      | 5                               | 11               | 0.31 | 40.0          | 48.74           | —       | —     | 79.5          | 68.47           |
|             |           |                                 | 12               | 0.33 |               |                 |         |       |               |                 |
| June .....  | 0.77      | 7                               | 7                | 0.20 | 34.0          | 41.62           | 2       | 25.0  | 72.0          | 62.02           |
|             |           |                                 | 28               | 0.42 |               |                 | 3       | 26.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 8       | 29.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 9       | 27.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 10      | 30.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 11      | 24.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 15      | 29.5  |               |                 |
|             |           |                                 |                  |      |               |                 | 19      | 27.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 20      | 26.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 22      | 26.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 23      | 27.0  |               |                 |
|             |           |                                 |                  |      |               |                 | 24      | 28.0  |               |                 |
| July .....  | 2.50      | 20                              | 1                | 0.22 | 39.0          | 46.65           | —       | —     | 65.0          | 60.06           |
|             |           |                                 | 2                | 0.40 |               |                 |         |       |               |                 |
|             |           |                                 | 3                | 0.38 |               |                 |         |       |               |                 |
|             |           |                                 | 13               | 0.11 |               |                 |         |       |               |                 |
|             |           |                                 | 18               | 0.27 |               |                 |         |       |               |                 |
|             |           |                                 | 27               | 0.37 |               |                 |         |       |               |                 |
|             |           |                                 | 28               | 0.20 |               |                 |         |       |               |                 |
|             |           |                                 | 29               | 0.17 |               |                 |         |       |               |                 |
| August ..   | 2.06      | 19                              | 2                | 0.38 | 36.0          | 44.33           | 22      | 30.0  | 72.0          | 60.21           |
|             |           |                                 | 3                | 0.18 |               |                 |         |       |               |                 |
|             |           |                                 | 6                | 0.12 |               |                 |         |       |               |                 |
|             |           |                                 | 13               | 0.19 |               |                 |         |       |               |                 |
|             |           |                                 | 14               | 0.31 |               |                 |         |       |               |                 |
|             |           |                                 | 20               | 0.44 |               |                 |         |       |               |                 |
| September   | 1.01      | 18                              | 1                | 0.14 | 37.0          | 46.37           | —       | —     | 84.0          | 67.00           |
|             |           |                                 | 17               | 0.27 |               |                 |         |       |               |                 |
| October ..  | 3.21      | 16                              | 4                | 0.14 | 40.0          | 53.23           | —       | —     | 98.0          | 74.81           |
|             |           |                                 | 6                | 0.26 |               |                 |         |       |               |                 |
|             |           |                                 | 11               | 0.21 |               |                 |         |       |               |                 |
|             |           |                                 | 20               | 0.41 |               |                 |         |       |               |                 |
|             |           |                                 | 21               | 0.74 |               |                 |         |       |               |                 |
|             |           |                                 | 23               | 0.12 |               |                 |         |       |               |                 |
|             |           |                                 | 24               | 0.72 |               |                 |         |       |               |                 |
|             |           |                                 | 29               | 0.86 |               |                 |         |       |               |                 |
| November    | 0.59      | 10                              | 4                | 0.19 | 43.0          | 54.13           | —       | —     | 97.0          | 78.23           |
|             |           |                                 | 17               | 0.17 |               |                 |         |       |               |                 |
|             |           |                                 | 24               | 0.14 |               |                 |         |       |               |                 |
| December.   | 0.75      | 7                               | 4                | 0.26 | 48.0          | 60.6            | —       | —     | 100.0         | 84.9            |
|             |           |                                 | 5                | 0.23 |               |                 |         |       |               |                 |



## DIARY NOTES.

Approximately 500 acres of fallow were broken up in 1929 and the heavy rains at the end of December made it possible to cultivate stubble land in readiness for seeding. The majority of such land to be sown was worked over in January. In the absence of further rain seeding was commenced with ensilage mixtures and oats and barley for green feed towards the end of March. The sowing of oats for hay and grain followed in April, and pease and barley in May. All stubble ground, some 665 acres, was then sown, but germination was slow and very irregular. In the absence of rain, wheat seeding was practically held over until the end of June, awaiting the definite break, which occurred on the 27th of that month.

Although showers were frequent in July, seeding work was not seriously interrupted and wheat seeding was completed by the middle of the month. The total area sown was 1,165 acres, made up thus:—Experimental plots, 212 acres; wheat (farm areas), 205 acres; oats (for grain and hay), 425 acres; barley, 65 acres; pease, 80 acres; hay and ensilage mixtures, 83 acres; greenfeed, 95 acres. The late sown crops came away particularly free from weeds, while the early sown ones, oats especially, were quite otherwise. The rapid growth in July and the check in September have already been referred to. At this time, too, eelworms appeared to be doing a considerable amount of damage, especially in oat crops, though their presence was detected in almost every crop on the farm.

The field sown with ensilage mixtures in test plots was too backward at the normal cutting time, in early October, and the headlands of well-grown crops sown on fallow were cut for this purpose, together with 150 acres of the oats which had practically failed. Ensilage making was completed by the end of October, and the binding of oats for hay and for threshing purposes was well in hand. During November this work was completed and all oats for grain threshed. Barley was all taken off with harvesters in the latter part of the month, and pea harvesting, protracted by unfavorable weather, was also completed. In addition to damage by frequent showers and boisterous weather, grubs made their appearance again and accounted largely for the partial failure of this crop. At the end of November hay cutting was completed, but stacking was interrupted by other work. All wheat for threshing (that is, the produce of the permanent experiment fields, some 110 acres) had been bound and stooked and a start had been made with the harvesters and strippers in the larger fields. This work, together with wheat threshing and hay carting, was completed by the middle of December.

*Straw.*—In addition to the straw pressed during threshing, stubble was again cut with binders following the harvesters. In this way approximately 40 tons were saved and stacked in the fields requiring stock shelter. The quantity of baled straw stacked was 150 tons, and the cocky chaff and cavings heap at the thresher was estimated to contain 30 tons. The pressed straw was the produce of 308 acres, so that the average yield was just under 10cwts. of clean straw per acre. The yield of grain was 11½bush. in the case of wheat and 16½bush. of oats per acre, or roughly 6cwts. of grain per acre over the whole area cut for threshing.

## WHEAT HARVEST.

Seeding had been at the rate of 90lbs. of seed with 1½cwts. of high grade super-phosphate per acre. In the farm areas the seed was dry pickled with copper carbonate, and in the test plots with copper sulphate, 1 per cent. solution, followed by immersion in ½ per cent. limewater and drying in the sun. Little or no trouble was experienced with any of the smut diseases; most varieties, however, showed a shrivelling of the grain, owing to causes already indicated. This was most marked in Field 6D, which



has been used for some years as a night paddock, and in which the soil dried out unusually quickly, owing, no doubt, to excess of the droppings of livestock. This accounts largely for the relatively poor returns in this field.

The total returns from wheat this year are shown in the next table, and the comparison between mean yields of this and previous seasons is shown in the table following.

TABLE V.—*Summarising the 1930 Wheat Returns.*

|                                         | Area.          | Total Yield.    | Yield per Acre. |
|-----------------------------------------|----------------|-----------------|-----------------|
|                                         | Acres.         | Bush. lbs.      | Bush. lbs.      |
| <b>Farm Areas—</b>                      |                |                 |                 |
| Nottle's B .....                        | 63-886         | 1,402 10        | 21 57           |
| Crouch's D .....                        | 47-599         | 887 44          | 18 39           |
| Grainger's B .....                      | 36-912         | 649 0           | 17 35           |
| No. 6 D .....                           | 29-464         | 303 4           | 10 17           |
| <b>Totals .....</b>                     | <b>177-861</b> | <b>3,241 58</b> | <b>18 14</b>    |
| <b>Experimental Plots—</b>              |                |                 |                 |
| Permanent Experiments .....             | 97-440         | 1,137 47        | 11 41           |
| Variety trial and miscellaneous plots.. | 30-977         | 337 48          | 10 54           |
| <b>Totals .....</b>                     | <b>128-417</b> | <b>1,475 35</b> | <b>11 30</b>    |
| <b>Grand Totals .....</b>               | <b>306-278</b> | <b>4,717 33</b> | <b>15 24</b>    |

TABLE VI.—*Showing the Average Yields of Wheat on the College Farm, 1921-30.*

| Season.                 | Rainfall. |        | Area Under Wheat. | Average Yield per Acre. |
|-------------------------|-----------|--------|-------------------|-------------------------|
|                         | "Useful." | Total. |                   |                         |
|                         | In.       | In.    | Acres.            | Bush. lbs.              |
| 1921 .....              | 12-98     | 17-16  | 286-4             | 16 56                   |
| 1922 .....              | 14-90     | 20-00  | 305-1             | 16 6                    |
| 1923 .....              | 25-30     | 27-46  | 184-1             | 15 44                   |
| 1924 .....              | 16-00     | 20-43  | 235-4             | 12 17                   |
| 1925 .....              | 14-18     | 15-65  | 248-2             | 18 56                   |
| 1926 .....              | 16-63     | 18-49  | 267-8             | 19 16                   |
| 1927 .....              | 11-73     | 14-59  | 312-2             | 15 44                   |
| 1928 .....              | 11-85     | 18-03  | 377-7             | 10 46                   |
| 1929 .....              | 9-73      | 13-06  | 251-1             | 15 11                   |
| 1930 .....              | 11-77     | 12-85  | 306-3             | 15 24                   |
| Mean for 27 years ..... | —         | —      | —                 | 17 1                    |

It will be seen that, excluding the experimental areas, a six bag average was taken off, and this, in the circumstances, represents a satisfactory return.

The next table shows the returns from different varieties sown on the farm areas. These are not strictly comparable, as the fields vary in soil quality, and were, of course, sown at different times; the figures are given, however, as being of some interest.



TABLE VII.—*Showing Yields of Varieties of Wheat Grown in the Farm Areas, 1930.*

| Variety.             | Area.  | Yield per Acre. |
|----------------------|--------|-----------------|
|                      | Acres. | Bush. lbs.      |
| Sword .....          | 16.8   | 26 45           |
| Nawab .....          | 5.3    | 23 40           |
| Felix .....          | 7.1    | 22 8            |
| Late Gluyas .....    | 22.9   | 21 35           |
| Florence .....       | 6.8    | 21 24           |
| Waratah .....        | 5.0    | 20 54           |
| Nabawa .....         | 5.3    | 20 27           |
| Sultan .....         | 14.2   | 19 40           |
| Daphne .....         | 15.1   | 18 35           |
| Ford .....           | 10.4   | 17 58           |
| Sirdar .....         | 0.3    | 17 54           |
| Canberra .....       | 11.3   | 17 51           |
| Gluford .....        | 20.7   | 17 49           |
| Gluyas .....         | 15.3   | 15 29           |
| Federation .....     | 3.6    | 14 29           |
| King's White .....   | 13.7   | 14 15           |
| President .....      | 10.2   | 14 15           |
| Dan .....            | 13.7   | 12 12           |
| Faun .....           | 3.0    | 11 24           |
| Caliph .....         | 5.0    | 7 29            |
| Free Gallipoli ..... | 7.8    | 7 23            |

The last four named varieties were sown in Field 6D, and, therefore, suffered from the disadvantageous conditions referred to above.

The prominence of Sword in the above list appears to be significant. This variety has been one of the heaviest yielders in test plots each year since 1925, and still apparently retains the lead when sown under field conditions on a relatively extensive area.

#### VARIETY TRIALS.

The practice of testing each of the varieties of wheat of interest or importance locally, in triplicate plots of approximately one-tenth of an acre each, has now been in vogue for three seasons. These plots are sown in one field under, as nearly as possible, comparable conditions. For purposes of comparison between varieties the



figures representing the mean yields in these plots are those now employed, and the details of yields of all varieties sown this year are given later on. In the next table are shown the test plot results for 1930 in respect of all wheats which have been grown on the College farm for six years or more, together with the recorded yields of these varieties from 1925 onward, and the mean yields over this period.

TABLE VIII.—*Showing Comparative Yields of Varieties of Wheat Grown more or less Extensively on the College Farm during the past Six Seasons or More.*

| Variety.            | 1925. |    | 1926. |    | 1927. |    | 1928. |    | 1929. |    | 1930. |    | Means. |    |
|---------------------|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|--------|----|
|                     | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.     | L. |
| Sword .....         | 37    | 7  | 30    | 57 | 27    | 49 | 25    | 41 | 15    | 57 | 16    | 16 | 25     | 38 |
| Caird .....         | 30    | 18 | 25    | 58 | 16    | 54 | 24    | 28 | 14    | 6  | 8     | 29 | 20     | 2  |
| Dawn .....          | 26    | 40 | 17    | 28 | 22    | 14 | 21    | 10 | 17    | 14 | 11    | 12 | 19     | 20 |
| Felix .....         | 21    | 27 | 26    | 8  | 18    | 58 | 19    | 23 | 14    | 2  | 14    | 26 | 19     | 4  |
| Nawab .....         | 16    | 11 | 27    | 27 | 14    | 27 | 25    | 25 | 15    | 2  | 15    | 15 | 18     | 57 |
| Caliph .....        | 21    | 26 | 24    | 26 | 22    | 15 | 20    | 50 | 14    | 45 | 9     | 11 | 18     | 49 |
| Ford .....          | 25    | 17 | 22    | 43 | 23    | 0  | 19    | 3  | 15    | 23 | 7     | 22 | 18     | 48 |
| Bordan .....        | 22    | 55 | 24    | 56 | 19    | 39 | 23    | 37 | 11    | 49 | 9     | 47 | 18     | 47 |
| Crostan .....       | 33    | 3  | 21    | 10 | 15    | 32 | 19    | 5  | 16    | 32 | 6     | 46 | 18     | 41 |
| Gluyas .....        | 21    | 40 | 19    | 52 | 14    | 31 | 23    | 52 | 16    | 48 | 14    | 19 | 18     | 31 |
| Gloss .....         | 19    | 3  | 19    | 26 | 21    | 46 | 19    | 55 | 16    | 10 | 12    | 13 | 18     | 6  |
| Gluford .....       | 21    | 54 | 19    | 10 | 16    | 21 | 24    | 9  | 13    | 11 | 12    | 49 | 17     | 56 |
| Sirdar .....        | 16    | 40 | 24    | 25 | 18    | 52 | 21    | 13 | 13    | 53 | 10    | 41 | 17     | 42 |
| Yilma .....         | 30    | 0  | 25    | 4  | 14    | 24 | 17    | 1  | 10    | 33 | 8     | 53 | 17     | 39 |
| King's White .....  | 22    | 36 | 18    | 57 | 15    | 47 | 19    | 46 | 17    | 23 | 11    | 2  | 17     | 35 |
| Sultan .....        | 21    | 21 | 18    | 14 | 17    | 8  | 21    | 6  | 17    | 31 | 9     | 23 | 17     | 27 |
| President .....     | 17    | 38 | 23    | 12 | 18    | 2  | 18    | 16 | 17    | 45 | 8     | 55 | 17     | 18 |
| Faun .....          | 17    | 16 | 18    | 24 | 18    | 53 | 20    | 42 | 13    | 57 | 13    | 7  | 17     | 3  |
| Dan .....           | 14    | 39 | 20    | 52 | 17    | 29 | 18    | 5  | 15    | 2  | 10    | 24 | 16     | 5  |
| Fay .....           | 17    | 9  | 15    | 36 | 16    | 32 | 19    | 28 | 15    | 20 | 10    | 42 | 15     | 50 |
| Glede .....         | 22    | 4  | 21    | 11 | 16    | 8  | 14    | 7  | 13    | 15 | 7     | 16 | 15     | 40 |
| Daphne .....        | 18    | 16 | 15    | 46 | 15    | 14 | 18    | 57 | 13    | 15 | 10    | 30 | 15     | 20 |
| Late Gluyas .....   | 16    | 59 | 14    | 27 | 13    | 1  | 20    | 16 | 13    | 27 | 10    | 30 | 14     | 47 |
| Begum .....         | 14    | 43 | 20    | 8  | 17    | 1  | 12    | 34 | 13    | 41 | 9     | 54 | 14     | 40 |
| Regal .....         | 15    | 31 | 21    | 23 | 12    | 1  | 15    | 55 | 16    | 14 | 6     | 58 | 14     | 40 |
| Zealand Blue .....  | 23    | 14 | 11    | 21 | 16    | 3  | 14    | 17 | 11    | 1  | 8     | 29 | 14     | 4  |
| Federation .....    | 15    | 45 | 18    | 51 | 15    | 32 | 11    | 51 | 14    | 36 | 7     | 35 | 14     | 2  |
| Maharajah .....     | 17    | 18 | 19    | 35 | 11    | 26 | 14    | 30 | 12    | 6  | 8     | 53 | 13     | 58 |
| Yandilla King ..... | 12    | 19 | 20    | 11 | 10    | 39 | 15    | 8  | 10    | 3  | 6     | 15 | 12     | 26 |
| Forel .....         | —     | —  | 17    | 33 | 17    | 30 | 24    | 44 | 10    | 50 | 12    | 25 | 16     | 36 |
| Regent .....        | —     | —  | —     | —  | 17    | 34 | 23    | 42 | 13    | 28 | 14    | 8  | 17     | 13 |
| Canaan .....        | —     | —  | —     | —  | 17    | 47 | 16    | 29 | 10    | 58 | 7     | 22 | 13     | 9  |

The prominence of the variety Sword in this list is again marked, and the difference between its mean yield and the next highest figure, namely, a difference of over 5½ bush., is sufficiently important to warrant the assumption that Sword has definitely superior yielding qualities, at least under Roseworthy conditions. The next 17 varieties (down to Faun) in this list are separated by a maximum difference of only 3 bush., which may be largely covered by experimental errors, and no definite conclusions should, therefore, be drawn from the results shown with regard to their relative yielding capacities. Of the remaining varieties (from Dan onwards) almost all have some undesirable qualities, such as relative lateness of maturity, which militate against their success under hard conditions.

The next table summarises the results of the triplicate variety tests of the past three seasons and shows, as well, the individual yields obtained in 1930, the varieties being arranged in order of grain yields of this year.



TABLE IX.—*Showing Grain and Hay Yields of all Varieties of Wheat Grown in Test Plots, 1930, together with Mean Yields, 1928-30.*

| Variety.                | Breeding.                                        | Grain Yields per Acre. |                 | Hay Yields per Acre. |                 |  |
|-------------------------|--------------------------------------------------|------------------------|-----------------|----------------------|-----------------|--|
|                         |                                                  | 1930.                  | Means, 1928-30. | 1930.                | Means, 1928-30. |  |
| Florence .....          | (Complex) .....                                  | B. L. 16 34            | B. L. 17 1      | T. C. L. 1 4 8       | T. C. L. 1 6 40 |  |
| Sword .....             | Sultan x Ford .....                              | 16 16                  | 19 28           | 1 4 109              | 1 10 19         |  |
| Noongaar .....          | Sunset x Gluyas .....                            | 15 27                  | —               | 1 1 39               | —               |  |
| Nawab .....             | Anvil x Sultan .....                             | 15 15                  | 18 34           | 1 6 30               | 1 8 64          |  |
| Canberra .....          | Federation x Volga Barley (?) .....              | 15 3                   | 16 7            | 1 5 12               | 1 7 14          |  |
| Currawa .....           | (Northern Champion x Cretan) x Little Club ..... | 14 32                  | 16 4            | 1 7 77               | 1 11 75         |  |
| Felix .....             | (King's White x Jonathan) x King's Red .....     | 14 26                  | 15 57           | 1 6 59               | 1 7 109         |  |
| Gluyas .....            | Selection ex Ward's Prolific ..                  | 14 19                  | 18 20           | 1 9 27               | 1 12 19         |  |
| Regent .....            | Regal x Gluyas .....                             | 14 8                   | 17 6            | 1 10 2               | 1 7 80          |  |
| Baldmin .....           | Bald Early x Minister .....                      | 13 14                  | 15 6            | 1 7 34               | 1 4 36          |  |
| Faun .....              | Late Gluyas x Anvil .....                        | 13 7                   | 15 55           | 1 7 5                | 1 6 26          |  |
| Gluford .....           | Ford x Gluyas .....                              | 12 49                  | 16 43           | 1 3 62               | 1 7 69          |  |
| Waratah .....           | Purple Straw x Gluyas .....                      | 12 49                  | 17 18           | 1 6 45               | 1 7 29          |  |
| Baroota Wonder .....    | Selection ex Ward's Prolific ..                  | 12 31                  | 15 40           | 1 5 69               | 1 5 36          |  |
| Sepoy .....             | Currawa x (Indian x Federation) ..               | 12 31                  | 13 38           | 1 10 17              | 1 4 71          |  |
| Forel .....             | Ford x Florence .....                            | 12 25                  | 16 0            | 1 4 110              | 1 6 38          |  |
| Nabawa .....            | Gluyas x Bunyip .....                            | 12 19                  | 15 49           | 1 8 23               | 1 7 5           |  |
| Gloss .....             | Zealand Blue x Gluyas .....                      | 12 13                  | 16 6            | 1 5 84               | 1 8 16          |  |
| (Unnamed) .....         | Federation x Scott's No. 1 ..                    | 12 7                   | —               | 1 4 22               | —               |  |
| Free Gallipoli .....    | Clubhead x Yandilla King ..                      | 12 7                   | 13 47           | 1 3 105              | 1 6 20          |  |
| Rajah .....             | Indian E. x Telfords .....                       | 12 0                   | 13 57           | 1 5 28               | 1 5 15          |  |
| (Unnamed) .....         | Selection ex Major .....                         | 11 49                  | —               | 1 6 45               | —               |  |
| Joffre .....            | (Red Bordeaux x Yandilla) x White Fife .....     | 11 42                  | 14 55           | 1 3 18               | 1 7 2           |  |
| (Unnamed) .....         | Yandilla King x Sultan .....                     | 11 31                  | —               | 1 6 102              | —               |  |
| Rance .....             | Indian F. x Federation .....                     | 11 13                  | 12 40           | 1 0 50               | 0 19 24         |  |
| Dawn .....              | Daphne x Faun .....                              | 11 12                  | 16 32           | 1 8 82               | 1 9 73          |  |
| Sirdar .....            | Felix x Tunis .....                              | 11 6                   | 15 24           | 1 15 37              | 1 12 44         |  |
| Kings White .....       | Selection ex King's Early ..                     | 11 2                   | 16 4            | 1 11 6               | 1 11 68         |  |
| (Unnamed) .....         | Dan x Gluyas .....                               | 11 0                   | —               | 1 6 74               | —               |  |
| (Unnamed) .....         | Sultan x Zealand Blue .....                      | 10 54                  | —               | 1 7 48               | —               |  |
| (Unnamed) .....         | Yandilla King x Caliph .....                     | 10 48                  | —               | 1 7 48               | —               |  |
| Fay .....               | Federation x Late Gluyas ..                      | 10 42                  | 15 10           | 1 5 55               | 1 8 95          |  |
| Late Gluyas .....       | Selection ex Gluyas .....                        | 10 30                  | 14 44           | 1 9 42               | 1 7 81          |  |
| Daphne .....            | Late Gluyas x Fan .....                          | 10 30                  | 14 14           | 1 6 88               | 1 6 45          |  |
| Walker's Wonder .....   | (Unknown) .....                                  | 10 29                  | 14 41           | 1 3 33               | 1 6 55          |  |
| Dan .....               | Daphne x Fane .....                              | 10 24                  | 14 30           | 1 6 102              | 1 6 13          |  |
| Indret .....            | Indian King x Bald Cretan ..                     | 10 14                  | 15 0            | 1 0 21               | 1 6 13          |  |
| (Unnamed) .....         | Caliph x Baroota Wonder ..                       | 10 11                  | —               | 1 5 55               | —               |  |
| Captain .....           | Fan x Caliph .....                               | 10 6                   | 11 2            | 1 11 86              | 1 3 13          |  |
| Triumph .....           | Silver King x Rangit .....                       | 10 6                   | 11 54           | 1 6 1                | 1 3 35          |  |
| Finch .....             | Federation x Caliph .....                        | 9 59                   | —               | 1 6 105              | —               |  |
| Begum .....             | Emperor x Caliph .....                           | 9 54                   | 12 3            | 1 7 92               | 1 5 38          |  |
| Huguenot .....          | Selection ex Medeah .....                        | 9 48                   | 9 49            | 1 10 89              | 1 12 4          |  |
| Bordan .....            | (Bearded Rieti x Ford) x Dan ..                  | 9 47                   | 14 44           | 1 3 76               | 1 8 60          |  |
| (Unnamed) .....         | Yandilla King x Florence ..                      | 9 35                   | —               | 1 3 91               | —               |  |
| Sultan .....            | King's White x Caliph .....                      | 9 23                   | 16 0            | 1 6 16               | 1 9 103         |  |
| Caliph .....            | Marshall's No. 3 x King's White ..               | 9 11                   | 14 55           | 1 7 63               | 1 9 3           |  |
| Marshall's No. 3 .....  | Sel. ex Ward's Prolific .....                    | 8 59                   | 12 11           | 1 7 5                | 1 4 0           |  |
| Maharajah .....         | King's Red x (King's White x Jonathan) .....     | 8 53                   | 11 50           | 1 10 89              | 1 9 33          |  |
| Yilma .....             | Yandilla King x Marshall's No. 3 .....           | 8 53                   | 12 9            | 1 7 34               | 1 8 67          |  |
| President .....         | (King's White x Jonathan) x King's Red .....     | 8 35                   | 14 52           | 1 6 15               | 1 10 10         |  |
| Caird .....             | Caliph x Ford .....                              | 8 29                   | 15 21           | 1 6 30               | 1 9 24          |  |
| Zealand Blue .....      | Zealand x Tardent's Blue ..                      | 8 29                   | 11 16           | 1 10 104             | 1 9 66          |  |
| Mac's White .....       | (Imported from New Zealand) ..                   | 8 23                   | 14 10           | 1 8 67               | 1 9 60          |  |
| Minister .....          | (Fife Indian x Durum D.) x Dart's Imperial ..... | 8 23                   | 12 40           | 1 2 43               | 1 1 17          |  |
| German Wonder .....     | Sel. ex White Tuscan .....                       | 8 5                    | 12 25           | 1 6 103              | 1 9 78          |  |
| White Tuscan .....      | Sel. ex Purple Straw .....                       | 8 4                    | 12 31           | 1 9 42               | 1 12 87         |  |
| Wannon .....            | Sel. ex Federation .....                         | 8 4                    | 11 28           | 1 1 26               | 1 2 8           |  |
| Major .....             | Federation x Wallace .....                       | 7 46                   | 11 50           | 1 4 95               | 1 9 20          |  |
| Satisfaction .....      | (Unknown) .....                                  | 7 41                   | —               | 1 1 68               | —               |  |
| Leak's Rust-proof ..... | Sel. ex White Tuscan .....                       | 7 40                   | 12 12           | 1 9 71               | 1 12 71         |  |
| Federation .....        | Yandilla x Purple Straw .....                    | 7 35                   | 11 21           | 0 17 110             | 1 3 110         |  |
| Ford .....              | Fan x Comeback .....                             | 7 22                   | 14 16           | 1 7 34               | 1 12 57         |  |
| Canaan .....            | Jonathan x Fan .....                             | 7 22                   | 12 38           | 1 8 9                | 1 10 63         |  |
| Onas .....              | Tarragon x Federation .....                      | 7 22                   | 10 39           | 1 0 21               | 1 3 41          |  |
| Glede .....             | Federation x Gluyas .....                        | 7 16                   | 11 33           | 1 2 14               | 1 7 19          |  |
| Regal .....             | King's Red x (King's White x Jonathan) .....     | 6 58                   | 13 2            | 1 6 73               | 1 9 4           |  |
| Nizam .....             | Indian 17 x Federation .....                     | 6 58                   | 10 15           | 0 13 51              | 0 18 41         |  |
| Crostan .....           | Zealand Blue x Sultan .....                      | 6 48                   | 14 8            | 1 6 88               | 1 13 2          |  |
| Turvey .....            | Sel. ex Marshall's No. 3 (?) ..                  | 6 40                   | 11 10           | 1 5 70               | 1 9 93          |  |
| Yandilla King .....     | Sel. ex Marshall's No. 3 (?) ..                  | 6 15                   | 10 29           | 1 3 18               | 1 7 91          |  |
| Wardar .....            | Yandilla x Silver King .....                     | 5 45                   | 10 11           | 1 8 52               | 1 8 98          |  |

\* Denotes variety bred at Roseworthy College.



It will be seen that the relatively early varieties, and those recognised as being hardy under drought conditions, occupy the first dozen positions or so in the above list. In this year's hay returns the leading varieties stand in this order:—Sirdar, Captain, King's White, Zealand Blue, Maharajah, Huguenot, Sepoy, Regent, &c.

Taking the mean figures for the three years, the best 18 varieties, having regard to grain yields, are:—Sword, Nawab, Gluyas, Waratah, Regent, Florence, Gluford, Dawn, Canberra, Gloss, King's White, Currawa, Forel, Sultan, Felix, Faun, Nabawa, and Baroota Wonder.

Comparing the mean hay returns similarly, the best varieties stand in this order:—Crostan, White Tuscan, Leak's Rust Proof, Ford, Sirdar, Gluyas, Huguenot, Currawa, King's White, Canaan, Sword, President, Sultan, Turwey, Dawn, German Wonder, Zealand Blue, Mac's White.

The figures representing the mean grain and hay yields of the principal "dual purpose" varieties have been extracted from the last two tables and are now set out together in the next table.

TABLE X.—*Showing Mean Grain and Hay Yields of the Better Dual Purpose Varieties of Wheat.*

| Variety.           | Period.       | Hay Yield per Acre. |    |     | Period.       | Grain Yield per Acre. |    |
|--------------------|---------------|---------------------|----|-----|---------------|-----------------------|----|
|                    |               | T.                  | C. | L.  |               | B.                    | L. |
| Crostan .....      | 1927-30 ..... | 1                   | 13 | 27  | 1925-30 ..... | 18                    | 41 |
| Sirdar .....       | 1927-30 ..... | 1                   | 13 | 106 | 1925-30 ..... | 17                    | 37 |
| Ford .....         | 1927-30 ..... | 1                   | 11 | 64  | 1925-30 ..... | 18                    | 48 |
| King's White ..... | 1927-30 ..... | 1                   | 13 | 32  | 1925-30 ..... | 17                    | 35 |
| Sultan .....       | 1927-30 ..... | 1                   | 11 | 11  | 1925-30 ..... | 17                    | 27 |
| President .....    | 1927-30 ..... | 1                   | 11 | 10  | 1925-30 ..... | 17                    | 18 |
| Regal .....        | 1927-30 ..... | 1                   | 12 | 6   | 1925-30 ..... | 14                    | 40 |

There appears to be little to choose between the majority of the above varieties from consideration of the mean yields. Crostan and Sirdar, however, from their behaviour in the farm crop as well as in test plots, appear to show special merit for general farm purposes. As a hay wheat the latter has the special attribute of a solid straw, derived from King's White, which figures prominently in the ancestry of each. Neither, however, has inherited the beard of King's White, and each is apparently a consistent and fairly heavy grain yielder.

(To be continued.)

## A USEFUL BRIDGE.

On a recent visit to Kangaroo Island Mr. C. H. Beaumont (Horticultural Instructor) noticed a very simple, yet attractive, suspension bridge, which was serving a useful purpose over a river on the property of an orchardist. The bridge was constructed by straining a roll of Cyclone pig netting (square woven) across the river, battens being inserted every 15in. through the netting to form a foothold. The hand rails were made of several strands of fencing wire, from which droppers, also of fencing wire, were tied to the bridge, and stays were arranged by similar ties under the bridge and made fast to the banks. The bridge could be made more rigid and stronger by using a light wire rope on each side of the netting with similar ropes as hand rails and to hold the hangers. It could be made perfectly safe for children by including light wire netting on the decking and for sides. With strainer posts firmly fixed on both sides of the river, such a structure would not be easily damaged at flood times.



## ORCHARD NOTES FOR SOUTHERN DISTRICTS, FEBRUARY, 1931.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

The main work of the month will be the completion of harvesting soft fruits and drying surplus fruits. The packing of apricots and peaches leaves much to be desired; ripe and green are sometimes rolled into a bushel box together, so that it is not surprising that prices are low. Drying of apricots and peaches has been dealt with in a pamphlet, which can be obtained from the department on enclosing twopence (stamp) for postage.

There will be few apples for export this season, and extra care will be necessary if they are to bring good prices; though we are short of apples, plenty will be sent from other States and will compete with ours. Pack according to regulations, and there will be no fear of rejection on the wharf; if any further information is required write to or call at the office of the Department.

Codlin moth is causing damage to the pip fruits, and there will be a big loss, even in the best sprayed orchards; this should be a good year to test out the white oils, with and without arsenate of lead. Use good water.

Pears are being offered for export, and with reasonable care should carry well; precooling seems to be a necessity for pears.

All racks, trays, and sheds should be thoroughly cleaned in preparation for drying vine fruits; do not take any risk of contamination by fruit moth; cleanliness is a dominating factor.

Vines are still liable to attacks of mildews if in showery or dewy weather, so it is well to keep watch and use preventives when required.

While trees are in full fruit mark those specially suitable for working from.

Scale insects on citrus are spreading rapidly now, and should be checked either by fumigation or by the use of white oils. Use good rain water and spray only on cloudy days or in the evening.

Irrigate young trees and vines, using fresh water only; loosen soil before it dries.

Pear slug or cherry slug should not be neglected—a light spray of arsenate of lead will kill it; dusting is easiest for hawthorn hedges, &c.

Silver leaf is very noticeable this year in pears, plums, and other fruits; cut out affected limbs, and paint cut with thick white lead.

### **HALMEG LINSEED MEAL**

|                   |         |             |
|-------------------|---------|-------------|
| 20 BAG LOTS ..... | 11/ BAG | } ON TRUCKS |
| 10-15 " " .....   | 11/3 "  |             |
| 1-9 " " .....     | 11/6 "  |             |

FINE GROUND FOR CALVES 1/- EXTRA.

STRICTLY CASH WITH ORDER.

**Charles Whiting & Chambers Ltd.**  
13, PITT STREET, ADELAIDE.



PURE-BRED COWS COMPLETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930.

| Hard Book No.         | Name of Cow.                      | Owner.                                 | Breed.   | Date Calved. | Age at Calving.                                                                | Total Milk.                                                 | Average Test.                                  | Total Butterfat.                     | Standard.                | Days Tested. | Remarks.  |
|-----------------------|-----------------------------------|----------------------------------------|----------|--------------|--------------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------|--------------------------------------|--------------------------|--------------|-----------|
|                       |                                   |                                        |          |              | Yrs. Days. <td>Lbs.<td>%<td>Lbs.<td>Lbs.<td></td><td></td></td></td></td></td> | Lbs. <td>%<td>Lbs.<td>Lbs.<td></td><td></td></td></td></td> | % <td>Lbs.<td>Lbs.<td></td><td></td></td></td> | Lbs. <td>Lbs.<td></td><td></td></td> | Lbs. <td></td> <td></td> |              |           |
| JUNIOR TWO-YEAR OLDS. |                                   |                                        |          |              |                                                                                |                                                             |                                                |                                      |                          |              |           |
| Not allotted          | Bloomfield Aleatras Rosebud ..    | W. Hawker, Clare .....                 | Friesian | 1/12/29      | 1 355                                                                          | 9,721½                                                      | 3.77                                           | 366.87                               | 200                      | 273          | —         |
| 24887                 | Woorora Bonny Pearl ...           | A. B. Sleber, Eudunda .....            | Jersey   | 17/2/30      | 1 273                                                                          | 7,113                                                       | 4.89                                           | 348.09                               | 200                      | 273          | —         |
| 24959                 | Pella Lorna Doone .....           | W. P. Eckermann, Eudunda .....         | Jersey   | 3/2/30       | 1 351                                                                          | 6,483                                                       | 5.29                                           | 342.86                               | 200                      | 273          | —         |
| 2652                  | Barina Pletje's Gem .....         | L. H. and P. C. Giles, Auburn .....    | Friesian | 5/10/29      | 2 151                                                                          | 11,559                                                      | 2.96                                           | 341.60                               | 200                      | 273          | —         |
| 18420                 | Kyby Bluebell .....               | Government Farm, Kybybolite .....      | Ayrshire | 24/2/30      | 2 118                                                                          | 7,817                                                       | 4.86                                           | 340.66                               | 200                      | 273          | —         |
| Not allotted          | Glen Murray Netherland Fides ..   | T. J. H. Dodd, Myponga .....           | Friesian | 10/3/30      | 1 341                                                                          | 9,257                                                       | 3.32                                           | 307.34                               | 200                      | 273          | —         |
| 3001                  | Barina Woodcrest Maid .....       | L. H. & P. C. Giles, Auburn .....      | "        | 11/12/29     | 1 335                                                                          | 8,374½                                                      | 3.67                                           | 307.30                               | 200                      | 273          | —         |
| 24703                 | Scrub View Linda .....            | A. B. A. Wecker, Brinkworth .....      | Jersey   | 6/12/29      | 2 162                                                                          | 5,046                                                       | 5.74                                           | 289.57                               | 200                      | 273          | —         |
| Not allotted          | Para Wirra Millie's Goldstream .. | J. H. Dawkins, Gawler .....            | "        | 26/3/30      | 2 23                                                                           | 5,376                                                       | 5.33                                           | 296.63                               | 200                      | 273          | —         |
| 17894                 | Masher's Model of The Bluff ..    | H. B. Kuchel, Murray Bridge .....      | M.S.     | 8/10/29      | 1 344                                                                          | 7,441½                                                      | 3.71                                           | 276.41                               | 200                      | 273          | —         |
| 24968                 | Pella Easter Lotus .....          | W. P. Eckermann, Eudunda .....         | Jersey   | 12/2/30      | 1 312                                                                          | 4,587                                                       | 5.97                                           | 273.95                               | 200                      | 273          | —         |
| 18424                 | Kyby Maggie III .....             | Government Farm, Kybybolite .....      | Ayrshire | 18/2/30      | 2 82                                                                           | 7,198                                                       | 3.77                                           | 271.02                               | 200                      | 273          | —         |
| 18427                 | Kyby Rita .....                   | Government Farm, Kybybolite .....      | "        | 27/10/29     | 2 179                                                                          | 6,379½                                                      | 4.21                                           | 268.37                               | 200                      | 273          | —         |
| Not allotted          | Glen Murray Daphne Segis .....    | T. J. H. Dodd, Myponga .....           | Friesian | 15/2/30      | 1 329                                                                          | 8,048                                                       | 3.31                                           | 266.59                               | 200                      | 273          | —         |
| 13106                 | Millie 10th of Melross .....      | Dunleith Pastoral Co., Ashbourne ..    | I.M.S.   | 5/4/30       | 2 81                                                                           | 6,890                                                       | 3.98                                           | 265.97                               | 200                      | 273          | —         |
| 24998                 | Hamden Olive .....                | I. A. J. Pittner, Hampden .....        | Jersey   | 16/3/30      | 1 271                                                                          | 4,989½                                                      | 5.31                                           | 262.35                               | 200                      | 273          | —         |
| 23569                 | Pella Butter Queen .....          | W. P. Eckermann, Eudunda .....         | "        | 14/3/30      | 1 323                                                                          | 4,731                                                       | 5.32                                           | 261.31                               | 200                      | 273          | —         |
| 13104                 | Gentle 9th of Melross .....       | Dunleith Pastoral Co., Ashbourne ..    | I.M.S.   | 16/3/30      | 2 98                                                                           | 6,645                                                       | 3.92                                           | 260.22                               | 200                      | 273          | —         |
| 18524                 | Gladys III. of East View .....    | H. H. Shillabeer, West Croydon .....   | "        | 12/1/29      | 2 34                                                                           | 5,601                                                       | 4.44                                           | 260.11                               | 200                      | 273          | —         |
| Not allotted          | Barton Croft Sweetbriar .....     | A. J. Marrett, Saddleworth .....       | Jersey   | 10/1/30      | 1 287                                                                          | 4,618½                                                      | 5.59                                           | 258.29                               | 200                      | 273          | —         |
| 17892                 | Masher's Lanka of The Bluff ..    | H. B. Kuchel, Murray Bridge .....      | M.S.     | 4/1/30       | 2 19                                                                           | 6,705                                                       | 3.85                                           | 258.06                               | 200                      | 273          | —         |
| Not allotted          | Para Wirra Millie's Beauty .....  | J. H. Dawkins, Gawler .....            | Jersey   | 24/3/30      | 1 235                                                                          | 4,732½                                                      | 5.37                                           | 254.29                               | 200                      | 273          | —         |
| 18426                 | Kyby Barly .....                  | Government Farm, Kybybolite .....      | Ayrshire | 27/9/29      | 2 27                                                                           | 6,322½                                                      | 4.02                                           | 254.08                               | 200                      | 273          | —         |
| 24968                 | Eudunda Chieftain's Lass .....    | W. S. McAuliffe, Eudunda .....         | Jersey   | 17/3/30      | 1 291                                                                          | 3,772½                                                      | 6.66                                           | 251.43                               | 200                      | 273          | —         |
| 18598                 | Princess of Northfield .....      | Insp. Gen. of Hospitals, Northfield .. | M.S.     | 18/1/30      | 2 134                                                                          | 5,688                                                       | 4.28                                           | 243.48                               | 200                      | 273          | —         |
| 17890                 | Flower 4th of Glen Loesle .....   | M. Cowan, Murray Bridge .....          | I.M.S.   | 22/1/30      | 2 56                                                                           | 5,801                                                       | 4.23                                           | 237.12                               | 200                      | 273          | —         |
| 13103                 | Fortune 8th of Melross .....      | Dunleith Pastoral Co., Ashbourne ..    | I.M.S.   | 5/4/30       | 2 166                                                                          | 5,475                                                       | 4.26                                           | 233.39                               | 200                      | 240          | Dried off |
| 24961                 | Crofton Sunshine .....            | H. & A. Bounie, Balmain .....          | Jersey   | 16/12/29     | 1 347                                                                          | 4,204½                                                      | 5.54                                           | 232.83                               | 200                      | 273          | —         |
| Not allotted          | Hill Farm Bellona II. ....        | E. W. Pittner, Eudunda .....           | "        | 13/11/29     | 1 309                                                                          | 3,468                                                       | 6.71                                           | 232.82                               | 200                      | 273          | —         |
| 26011                 | Woorora Royal Lotus .....         | A. B. Sleber, Eudunda .....            | "        | 9/2/30       | 1 351                                                                          | 4,248                                                       | 5.37                                           | 227.98                               | 200                      | 273          | —         |
| Not allotted          | Mayflower 5th of Klana .....      | E. & A. Nicholls, Woodville .....      | I.M.S.   | 2/30         | 2 —                                                                            | 6,153                                                       | 3.66                                           | 224.99                               | 200                      | 273          | —         |
| Not allotted          | Ontario Fredy .....               | T. B. Brooks, Clarendon .....          | Jersey   | 10/2/30      | 1 218                                                                          | 3,856½                                                      | 5.24                                           | 202.13                               | 200                      | 273          | —         |



PURE-BRED COWS COMPLETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930—continued.

| Herd Book No.                                   | Name of Cow.                    | Owner.                               | Breed.   | Date Calved. | Age at Calving. | Total Milk. | Average Test. | Total Butter-fat. | Stand-ard. | Days Tested. | Remarks.                  |
|-------------------------------------------------|---------------------------------|--------------------------------------|----------|--------------|-----------------|-------------|---------------|-------------------|------------|--------------|---------------------------|
| JUNIOR TWO-YEAR-OLDS—continued.                 |                                 |                                      |          |              |                 |             |               |                   |            |              |                           |
| 18425                                           | Kyby May                        | Government Farm, Kybybolite          | Ayrshire | 22/1/30      | 2 16            | 4,934       | 3.96          | 195.46            | 200        | 273          | —                         |
| Not allotted                                    | Gold II. of East View           | H. H. Shillabeer, West Croydon       | I.M.S.   | 8/11/29      | 2 60            | 5,181       | 3.71          | 192.42            | 200        | 273          | —                         |
| 17890                                           | Mather's Duchess of The Bluff   | H. B. Kuchel, Murray Bridge          | M.S.     | 12/10/29     | 1 351           | 5,029†      | 3.77          | 189.55            | 200        | 273          | —                         |
| 24940                                           | Pella Madeira Queen             | W. P. Eckermann, Eudunda             | Jersey   | 13/2/30      | 1 205           | 3,591       | 5.01          | 179.90            | 200        | 273          | —                         |
| 18307                                           | Royal's Tot of Glen Lessie      | M. Cowan, Murray Bridge              | M.S.     | 28/10/29     | 1 268           | 4,129†      | 4.23          | 174.81            | 200        | 273          | —                         |
| Not allotted                                    | Cliffside Segs Buttarcup        | H. T. Kleeman, Mypolonga             | Friesian | 12/1/30      | 2 124           | 5,145       | 3.17          | 163.20            | 200        | 180          | Owner withdrawn from test |
| 18364                                           | Flirt II. of Northfield         | Inspe. Gen. of Hospitals, Northfield | M.S.     | 18/1/30      | 2 80            | 3,390       | 4.29          | 145.29            | 200        | 180          | Dried off                 |
| 20821                                           | West Kilbride Floral            | H. D. Secomb & Son, Two Wells        | Ayrshire | 5/2/30       | 2 151           | 3,120       | 4.23          | 131.92            | 200        | 150          | Owner withdrawn from Test |
| 17895                                           | Pearl of The Bluff              | H. B. Kuchel, Murray Bridge          | M.S.     | 10/1/30      | 1 250           | 3,063       | 4.02          | 123.06            | 200        | 273          | —                         |
| 24996                                           | Hampden Mariposa's Pet          | J. A. J. Pittner, Hampden            | Jersey   | 12/6/30      | 2 12            | 1,830       | 5.49          | 100.52            | 200        | 120          | Sold                      |
| 24850                                           | Jane of Oakhill                 | Mrs. G. G. Neumann, Hampden          | "        | 15/3/30      | 2 164           | 1,560       | 5.98          | 93.30             | 200        | 210          | Withdrawn                 |
| 24995                                           | Hampden King's Gular            | J. A. J. Pittner, Hampden            | "        | 23/3/30      | 1 278           | 1,725       | 4.91          | 84.65             | 200        | 120          | Sold                      |
| JUNIOR TWO-YEAR-OLDS—BUTTERFAT STANDARD 230LBS. |                                 |                                      |          |              |                 |             |               |                   |            |              |                           |
| 24997                                           | Hampden Mayfair                 | J. A. J. Pittner, Hampden            | Jersey   | 5/7/30       | 1 352           | 2,460       | 5.01          | 123.35            | 230        | 120          | Dried off                 |
| Not allotted                                    | Searchlight's Tot of Stratbearn | E. A. Groth, Walker's Flat           | M.S.     | 9/9/30       | 2 129           | 2,295       | 9.84          | 88.05             | 230        | 90           | Withdrawn                 |
| "                                               | Eudunda Lady's Damsel           | W. S. McAuliffe, Eudunda             | Jersey   | 28/10/30     | 1 234           | 1,260       | 4.97          | 62.56             | 230        | 60           | Withdrawn                 |
| "                                               | Burnlea Blandina II.            | J. M. Hudd, Bleckley                 | "        | 4/9/30       | 2 —             | 660         | 4.92          | 32.48             | 230        | 30           | Withdrawn                 |
| SENIOR TWO-YEAR-OLDS—BUTTERFAT STANDARD 225LBS. |                                 |                                      |          |              |                 |             |               |                   |            |              |                           |
| 24858                                           | Woorora Starbright's Doris      | A. B. Sieber, Eudunda                | Jersey   | 12/2/30      | 2 220           | 7,035       | 5.63          | 396.29            | 225        | 273          | —                         |
| 23604                                           | Hampden Rhodessa II.            | A. E. Middleton, Balaklava           | "        | 1/11/29      | 2 281           | 6,333       | 5.91          | 374.32            | 225        | 273          | —                         |
| 24865                                           | Scrub View Daffodil             | A. B. A. Wecker, Brinkworth          | "        | 25/3/30      | 2 208           | 6,667†      | 5.56          | 370.59            | 225        | 273          | —                         |
| 23550                                           | Crofton Kathleen                | H. & A. Bohme, Balmanah              | "        | 11/4/30      | 2 382           | 6,546       | 5.60          | 366.87            | 225        | 273          | —                         |
| 25006                                           | Myrtle Bank Eileen              | W. A. Rodda, Salisbury               | "        | 4/10/29      | 2 257           | 6,169†      | 5.77          | 355.87            | 225        | 273          | —                         |
| Not allotted                                    | Murray Glen Inks Tulip III.     | C. J. Morris, Monteth                | Friesian | 27/3/30      | 2 287           | 9,819       | 3.57          | 350.91            | 225        | 273          | —                         |
| 23588                                           | Eudunda Merden's Damsel         | W. S. McAuliffe, Eudunda             | Jersey   | 12/2/30      | 2 245           | 6,001†      | 5.65          | 339.14            | 225        | 273          | —                         |
| 23625                                           | Roseworthy Princess 29th        | Agric. College, Roseworthy           | "        | 10/1/30      | 2 302           | 6,138       | 5.43          | 333.52            | 225        | 273          | —                         |
| 3159                                            | Murray Glen Echo Patch          | C. J. Morris, Monteth                | Friesian | 6/1/30       | 2 331           | 9,741       | 3.35          | 326.23            | 225        | 273          | —                         |
| 15016                                           | Waratah's Sunshade of The Bluff | H. B. Kuchel, Murray Bridge          | M.S.     | 31/1/30      | 2 352           | 6,859†      | 4.09          | 280.43            | 225        | 273          | —                         |
| 23603                                           | Hampden Rae                     | J. A. J. Pittner, Hampden            | Jersey   | 22/3/30      | 2 313           | 5,494†      | 5.08          | 279.26            | 225        | 273          | —                         |
| Not allotted                                    | Buttarcup of Second Valley      | L. J. Calles, Mypolonga              | M.S.     | 8/10/29      | 2 332           | 6,930       | 4.00          | 277.37            | 225        | 240          | Dried off                 |
| 23626                                           | Roseworthy Princess 30th        | Agric. College, Roseworthy           | Jersey   | 10/12/29     | 2 265           | 4,572       | 5.80          | 264.96            | 225        | 273          | —                         |
| 18429                                           | Kyby Sadie                      | Government Farm, Kybybolite          | Ayrshire | 26/3/30      | 2 212           | 5,958       | 4.33          | 257.73            | 225        | 273          | —                         |



PURE-BRED COWS COMPETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930—continued.

| Herd Book No.                                               | Name of Cow.                       | Owner.                                 | Breed.   | Date Calved. | Age at Calving. | Total Milk. | Average Test. | Total Butterfat. | Stand-ard. | Days Tested. | Remarks.                     |
|-------------------------------------------------------------|------------------------------------|----------------------------------------|----------|--------------|-----------------|-------------|---------------|------------------|------------|--------------|------------------------------|
| SENIOR TWO-YEAR-OLDS—BUTTERFAT STANDARD 225 LBS.—continued. |                                    |                                        |          |              |                 |             |               |                  |            |              |                              |
|                                                             |                                    |                                        |          | Yrs.         | Days.           | Lbs.        | %             | Lbs.             | Lbs.       |              |                              |
| 23024                                                       | Roseworthy Princess 28th           | Agric. College, Roseworthy             | Jersey   | 13/12/29     | 2               | 287         | 6.94          | 244.88           | 225        | 273          | —                            |
| 18526                                                       | Mayflower 4th of Kiana             | E. & A. Nicholls, Woodville            | I.M.S.   | 3/10/29      | 2               | 362         | 3.63          | 240.37           | 225        | 273          | —                            |
| 24506                                                       | Scrub View Daniel                  | A. B. A. Wecker, Brinkworth            | Jersey   | 10/3/30      | 2               | 195         | 4.78          | 235.55           | 225        | 273          | —                            |
| 23628                                                       | Roseworthy Rosal                   | Agric. College, Roseworthy             | "        | 3/11/29      | 2               | 346         | 6.03          | 230.77           | 225        | 273          | —                            |
| 1758                                                        | Glenslea Fl Fl                     | K. H. Edwards, Meadows                 | Guernsey | 15/1/30      | 2               | 234         | 5.91          | 167.46           | 225        | 180          | Owner withdrawn from test    |
| 23601                                                       | Hampden King's Carnation           | J. A. J. Pitzner, Hampden              | Jersey   | 26/6/30      | 2               | 239         | 6.00          | 41.43            | 225        | 30           | Sold                         |
| JUNIOR THREE-YEAR OLDS—BUTTERFAT STANDARD 250 LBS.          |                                    |                                        |          |              |                 |             |               |                  |            |              |                              |
|                                                             |                                    |                                        |          | Yrs.         | Days.           | Lbs.        | %             | Lbs.             | Lbs.       |              |                              |
| 24701                                                       | Pella Gypsy Lotus                  | E. W. Pitzner, Eudunda                 | Jersey   | 24/1/30      | 3               | 158         | 5.14          | 485.37           | 250        | 273          | —                            |
| 5892                                                        | Anana Gen's Roline                 | W. Hawker, Clare                       | Friesian | 12/12/29     | 3               | 115         | 3.18          | 481.00           | 250        | 273          | —                            |
| 2842                                                        | Todara Vemman Pauline              | W. Hawker, Clare                       | "        | 3/9/29       | 3               | 55          | 3.69          | 404.51           | 250        | 273          | —                            |
| 23639                                                       | Roseworthy Sunbeam                 | Agric. College, Roseworthy             | Jersey   | 18/12/29     | 3               | 123         | 5.43          | 320.65           | 250        | 273          | —                            |
| 23602                                                       | Hampden Maid                       | J. A. J. Pitzner, Hampden              | "        | 5/10/29      | 3               | 64          | 5.655         | 308.29           | 250        | 273          | —                            |
| 23650                                                       | Roseworthy Princess 24th           | Agric. College, Roseworthy             | "        | 16/11/29     | 3               | 64          | 5.77          | 294.65           | 250        | 273          | —                            |
| 18330                                                       | Prinrose of Kiana                  | E. & A. Nicholls, Woodville            | I.M.S.   | 20/10/29     | 3               | 95          | 3.87          | 282.81           | 250        | 273          | —                            |
| 15034                                                       | Princess II. of Ben Lomond         | Inspecc.-Gen. of Hospitals, Northfield | M.S.     | 3/11/29      | 3               | 113         | 4.13          | 268.13           | 250        | 273          | —                            |
| Not allotted                                                | Daisy of Second Valley             | L. J. Calles, Mypolonga                | I.M.S.   | 28/11/29     | 3               | 45          | 6.019 1/2     | 257.37           | 250        | 273          | —                            |
| 18309                                                       | Lovely of Ben Lomond               | J. J. Farrow, Gawler                   | M.S.     | 19/11/29     | 3               | 77          | 4.38          | 233.87           | 250        | 273          | —                            |
| 15014                                                       | Lester's Model's Dawn of The Bluff | H. B. Kuchel, Murray Bridge            | "        | 3/2/30       | 3               | 72          | 5.985         | 230.42           | 250        | 240          | Dried off                    |
| 24626                                                       | Para Wilra Snowflake               | J. H. Dawkins, Gawler                  | Jersey   | 10/5/30      | 3               | 136         | 3.780         | 216.28           | 250        | 120          | Sold                         |
| 18759                                                       | Oakbank Olive                      | J. O. Robinson, Meadows                | Ayrshire | 3/2/30       | 3               | 136         | 3.77          | 210.42           | 250        | 240          | Dried off                    |
| 15032                                                       | Flirt of Northfield                | Inspecc.-Gen. of Hospitals, Northfield | M.S.     | 28/1/30      | 3               | 73          | 5.247         | 209.52           | 250        | 273          | —                            |
| 18139                                                       | Violet II. of Glenrobin            | J. O. Robinson, Meadows                | "        | 25/1/30      | 3               | 163         | 3.89          | 197.05           | 250        | 273          | —                            |
| 19229                                                       | West Kilbride Fancy Floss          | H. D. Second & Sons, Two Wells         | "        | 30/1/30      | 3               | 135         | 3.720         | 166.11           | 250        | 150          | Owner withdrawn from testing |
| 15015                                                       | Model's Lass of The Bluff          | H. B. Kuchel, Murray Bridge            | M.S.     | 27/1/30      | 3               | 35          | 3.900         | 135.82           | 250        | 210          | Dried off                    |
| 15082                                                       | Lanka's Sunflower of The Bluff     | H. B. Kuchel, Murray Bridge            | "        | 3/3/30       | 3               | 19          | 3.035         | 116.03           | 250        | 150          | Dried off                    |
| JUNIOR THREE-YEAR-OLD—BUTTERFAT STANDARD 270 LBS.           |                                    |                                        |          |              |                 |             |               |                  |            |              |                              |
| 18480                                                       | Kyby Viola                         | Government Farm, Kybybolite            | Ayrshire | 7/9/30       | 3               | 28          | 1,920         | 67.50            | 270        | 60           | Sold                         |
| SENIOR THREE-YEAR-OLDS—BUTTERFAT STANDARD 275 LBS.          |                                    |                                        |          |              |                 |             |               |                  |            |              |                              |
| 3302                                                        | Murray Glen Griselde's Patch       | C. J. Morris, Monteth                  | Friesian | 5/3/30       | 3               | 353         | 11,284 1/2    | 457.76           | 275        | 273          | —                            |
| 24547                                                       | Dalebank Fairy Queen 3rd           | A. J. Marrett, Saddleworth             | Jersey   | 11/8/30      | 3               | 241         | 7,813 1/2     | 378.71           | 275        | 273          | —                            |
| 23645                                                       | Kavimade Trilby's Olive            | H. E. Walsh, Salisbury                 | "        | 26/11/29     | 3               | 321         | 6,643 1/2     | 372.84           | 275        | 273          | —                            |
| 26646                                                       | Roseworthy Princess 21st           | Agric. College, Roseworthy             | "        | 1/11/29      | 3               | 342         | 5,502         | 327.66           | 275        | 273          | —                            |



PURE-BRED COWS COMPLETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930—continued.

| Herd Book No.                                     | Name of Cow.                                 | Owner.                                | Breed.   | Date Calved. | Age at Calving. | Total Milk. | Average Test. | Total Butterfat. | Stand. Gard. | Days Tested. | Remarks.                                                                                            |
|---------------------------------------------------|----------------------------------------------|---------------------------------------|----------|--------------|-----------------|-------------|---------------|------------------|--------------|--------------|-----------------------------------------------------------------------------------------------------|
| SENIOR THREE-YEAR-OLDS—BUTTERFAT STANDARD 275LBS. |                                              |                                       |          |              |                 |             |               |                  |              |              |                                                                                                     |
| 17561                                             | Glen Rosette of Glen Leslie.                 | M. Cowan, Murray Bridge               | M.S.     | 18/10/29     | 3 222           | 8,064       | 3-96          | 319-41           | 275          | 273          | —                                                                                                   |
| 2351                                              | Barina Pietje's Twig.                        | L. H. & P. C. Gilles, Auburn          | Friesian | 3/12/29      | 3 194           | 9,057       | 2-81          | 254-73           | 275          | 273          | —                                                                                                   |
| 23699                                             | Kampden Thora's Twyllah                      | A. E. Middleton, Balaklava            | Jersey   | 21/6/30      | 3 266           | 2,850       | 5-33          | 151-77           | 275          | 190          | Sold                                                                                                |
| 20610                                             | West Kilbride Cinderella                     | H. D. Secomb & Son, Two Wells         | Ayrshire | 22/2/30      | 3 184           | 2,805       | 4-07          | 114-28           | 275          | 120          | Owner withdrawn from test                                                                           |
| 15031                                             | Buttercup 2nd of Ben Lomond                  | Inspecc-Gen. of Hospitals, Northfield | M.S.     | 3/4/30       | 3 265           | 2,497½      | 4-35          | 108-56           | 275          | 180          | Dried off                                                                                           |
| 1843                                              | Glenlea Dixie                                | K. H. Edwards, Meadows                | Guernsey | 13/2/30      | 3 219           | 3,645       | 5-85          | 213-27           | 275          | 180          | Not tested for following four mths. Gave 240lbs. milk and 12-47lbs. butterfat during 11½ sub period |
| JUNIOR FOUR-YEAR OLDS—BUTTERFAT STANDARD 300LBS.  |                                              |                                       |          |              |                 |             |               |                  |              |              |                                                                                                     |
| 2501                                              | Murray Glen Griselda's Olds.                 | C. J. Morris, Monteth                 | Friesian | 1/3/30       | 4 37            | 11,593½     | 3-72          | 430-96           | 300          | 273          | —                                                                                                   |
| 19075                                             | Pearl of Hampden                             | J. A. J. Pätzner, Hampden             | Jersey   | 18/10/29     | 4 99            | 7,788       | 5-46          | 425-02           | 300          | 273          | —                                                                                                   |
| 19087                                             | Heather of East View                         | H. H. Shillaber, West Croydon.        | I.M.S.   | 3/1/30       | 4 52            | 8,376       | 4-80          | 402-07           | 300          | 273          | —                                                                                                   |
| 20730                                             | Sunbeam of Dalebank                          | H. & A. Bohme, Balhannah              | Jersey   | 10/3/30      | 4 33            | 7,149       | 5-30          | 379-13           | 300          | 273          | —                                                                                                   |
| Not allocated                                     | Henley Rosene                                | H. T. Kleemann, Myponga               | Friesian | 2/12/29      | 4 53            | 10,243½     | 3-59          | 367-62           | 300          | 273          | —                                                                                                   |
| 2350                                              | Barina Coolangatta Buttercup                 | L. H. & P. C. Gilles, Auburn          | "        | 6/12/29      | 4 117           | 10,090½     | 3-33          | 335-96           | 300          | 273          | —                                                                                                   |
| 2349                                              | Murray Glen Echo Sylvia                      | C. J. Morris, Monteth                 | "        | 14/2/30      | 4 87            | 9,123       | 3-63          | 331-16           | 300          | 273          | —                                                                                                   |
| 19088                                             | Fortune 3rd of East View                     | Danielth Pastoral Co., Ashbourne      | I.M.S.   | 11/3/30      | 4 20            | 6,690       | 4-17          | 278-69           | 300          | 273          | —                                                                                                   |
| 15033                                             | Janet of Ben Lomond                          | Inspecc-Gen. of Hospitals, Northfield | M.S.     | 8/1/30       | 4 162           | 6,031½      | 4-46          | 269-26           | 300          | 273          | —                                                                                                   |
| 2463                                              | Glenowie Plus Olds.                          | H. Mountstephen, Monteth              | Friesian | 1/12/29      | 4 153           | 8,595       | 3-00          | 257-89           | 300          | 210          | Owner withdrawn from test                                                                           |
| 20829                                             | Lady Bell of Hampden                         | W. S. McAuliffe, Eudunda              | Jersey   | 25/3/30      | 4 52            | 4,455       | 5-23          | 232-90           | 300          | 180          | Sold                                                                                                |
| 2455                                              | Glenowie Echo Posch                          | H. Mountstephen, Monteth              | Friesian | —/2/30       | 4 2/12          | 5,730       | 3-63          | 207-83           | 300          | 150          | Owner withdrawn from test                                                                           |
| 19066                                             | Jenny III. of Oakhill                        | Mrs. B. G. Neumann, Hampden.          | Jersey   | 6/10/29      | 4 173           | 2,710½      | 5-62          | 152-42           | 300          | 273          | —                                                                                                   |
| 19228                                             | West Kilbride Fancy Fern                     | H. D. Secomb & Son, Two Wells         | Ayrshire | 11/2/30      | 4 131           | 3,300       | 4-43          | 146-29           | 300          | 150          | Owner withdrawn from test                                                                           |
| JUNIOR FOUR-YEAR-OLDS—BUTTERFAT STANDARD 310LBS.  |                                              |                                       |          |              |                 |             |               |                  |              |              |                                                                                                     |
| 20764                                             | Leda Grey of Pella                           | W. P. Eckermann, Eudunda.             | Jersey   | 3/8/30       | 4 98            | 3,810       | 5-84          | 222-50           | 310          | 120          | Sold                                                                                                |
| 16393                                             | Kyby Rosebud                                 | Government Farm, Kybybolite           | Ayrshire | 17/8/30      | 4 121           | 1,680       | 3-70          | 62-18            | 310          | 30           | Sold                                                                                                |
| SENIOR FOUR-YEAR-OLDS—BUTTERFAT STANDARD 325LBS.  |                                              |                                       |          |              |                 |             |               |                  |              |              |                                                                                                     |
| 19042                                             | Flower of Dalebank                           | J. M. Bray, Langhorne's Creek.        | Jersey   | 31/10/29     | 4 274           | 9,093       | 5-41          | 492-31           | 325          | 273          | —                                                                                                   |
| 2349                                              | Pride's Violet of Balaklava                  | A. E. Middleton, Balaklava            | Friesian | 29/10/29     | 4 199           | 10,123½     | 3-96          | 400-51           | 325          | 273          | —                                                                                                   |
| 14867                                             | Searchlight's Somerset's Princess of Wangara | J. J. Farrow, Gawler                  | M.S.     | 14/10/29     | 4 216           | 8,946       | 4-44          | 397-37           | 325          | 273          | —                                                                                                   |
| 19079                                             | Roseworthy Princess 18th                     | Agric. College, Roseworthy            | Jersey   | 21/10/29     | 4 200           | 5,755½      | 6-75          | 388-73           | 325          | 273          | —                                                                                                   |



PURE-BRED COWS COMPLETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930—continued.

| Herd Book No.                                                | Name of Cow.                    | Owner.                              | Breed.   | Date Calved. | Age at Calving. | Total Milk. | Average Test. | Total Butter-fat. | Standard. | Days Tested. | Remarks.                     |
|--------------------------------------------------------------|---------------------------------|-------------------------------------|----------|--------------|-----------------|-------------|---------------|-------------------|-----------|--------------|------------------------------|
| SENIOR FOUR-YEAR-OLDS—BUTTERFAT STANDARD 325 LBS.—continued. |                                 |                                     |          |              |                 |             |               |                   |           |              |                              |
|                                                              |                                 |                                     |          |              | Yrs. Days.      | Lbs.        | %             | Lbs.              | Lbs.      |              |                              |
| 20766 Not allotted                                           | Solanum's Fancy of Pella        | W. P. Eckermann, Eudunda.           | Jersey   | 23/3/30      | 4 232           | 6,795       | 4.98          | 338-14            | 325       | 273          | —                            |
| 20701                                                        | Wiaros Rosette                  | H. T. Klemann, Mypolonga            | Friesian | 18/11/29     | 4 341           | 8,475       | 3.12          | 264-55            | 325       | 210          | Owner withdrawn from test    |
| 20701                                                        | Lady McEwin 18th of Penrhyn     | A. J. Marrett, Saddleworth          | Jersey   | 23/3/30      | 4 320           | 5,323½      | 4.77          | 253-84            | 325       | 273          | —                            |
| 18561                                                        | Janet of East View              | H. B. Kuchel, Murray Bridge         | M.S.     | 19/11/29     | 4 341           | 6,705       | 3.40          | 228-04            | 325       | 180          | Dried off                    |
| MATURE COWS—BUTTERFAT STANDARD 350 LBS.                      |                                 |                                     |          |              |                 |             |               |                   |           |              |                              |
| 1971                                                         | River Glen Queen Ruby           | W. Hawker, Clare                    | Friesian | 10/1/30      | 5 321           | 19,714½     | 3.82          | 753-03            | 350       | 273          | —                            |
| 804                                                          | Rosevale Victoria Posch         | R. W. Peterson, Long Flat           | "        | 21/1/30      | 10 78           | 16,074      | 3.75          | 602-68            | 350       | 273          | —                            |
| 2256                                                         | River Glen Galates Kougen       | L. H. & P. C. Giles, Auburn         | "        | 16/10/29     | 5 42            | 15,655½     | 3.44          | 539-02            | 350       | 273          | —                            |
| 17992                                                        | Roseworthy Rudie                | Agric. College, Roseworthy          | Jersey   | 15/2/30      | 5 199           | 8,691       | 7.47          | 404-56            | 350       | 273          | —                            |
| 20817                                                        | Rosemary of Watertall           | A. E. Middleton, Bakatava           | "        | 13/10/29     | 6 263           | 8,977½      | 5.21          | 466-45            | 350       | 273          | —                            |
| 1918                                                         | Murray Glen Princess Hauraki    | C. J. Morris, Monteth               | Friesian | 14/3/30      | 6 158           | 14,014½     | 3.27          | 458-72            | 350       | 273          | —                            |
| 1878                                                         | Henley Bud Pontiac              | C. J. Morris, Monteth               | "        | 15/2/30      | 6 62            | 10,867½     | 4.21          | 457-18            | 350       | 273          | —                            |
| 18905                                                        | Kate Kelly of Pella             | W. P. Eckermann, Eudunda            | Jersey   | 18/3/30      | 6 66            | 7,606       | 6.01          | 457-01            | 350       | 273          | —                            |
| 13245                                                        | Damsel of Brinkley              | H. R. Walsh, Salisbury              | "        | 6/2/30       | 9 138           | 10,323      | 4.42          | 456-81            | 350       | 273          | —                            |
| 18824                                                        | Columbine Lady 5th of Glen Ewin | A. J. Marrett, Saddleworth          | "        | 4/11/29      | 6 67            | 7,984½      | 5.38          | 429-30            | 350       | 273          | —                            |
| 13602                                                        | Lady Fern of Fernden            | E. O. Traeger, Eudunda              | "        | 19/11/29     | 7 6             | 8,659½      | 4.94          | 427-49            | 350       | 273          | —                            |
| 12844                                                        | Queen of Hampden                | J. A. J. Pittner, Hampden           | "        | 19/2/30      | 7 196           | 7,686½      | 5.49          | 419-44            | 350       | 273          | —                            |
| 10595                                                        | Princess Audrey of Pella        | A. B. Sleber, Eudunda               | "        | 13/2/30      | 8 273           | 7,768½      | 5.37          | 417-54            | 350       | 273          | —                            |
| 1850                                                         | East View Dorain Pauline        | H. Mountstephen, Monteth            | Friesian | 26/11/29     | 5 257           | 9,750       | 4.09          | 397-99            | 350       | 210          | Owner withdrawn from testing |
| 1590                                                         | Henley Tulip III.               | C. J. Morris, Monteth               | "        | 13/10/29     | 7 114           | 10,275      | 3.86          | 396-06            | 350       | 273          | —                            |
| 14316                                                        | Viola of Hampden                | J. A. J. Pittner, Hampden           | Jersey   | 26/1/30      | 6 252           | 6,564       | 5.78          | 396-43            | 350       | 273          | —                            |
| 5301                                                         | Olive II. of Greydegh           | E. & A. Nicholls, Woodville         | M.S.     | 2/12/29      | 8 36            | 10,431      | 3.79          | 395-54            | 350       | 273          | —                            |
| 17916                                                        | Millie Zist of Willow Farm      | J. H. Dawkins, Gawler               | Jersey   | 8/14/30      | 8 130           | 7,456½      | 5.23          | 389-78            | 350       | 273          | —                            |
| 16951                                                        | Bees of Klana                   | E. & A. Nicholls, Woodville         | M.S.     | 13/2/30      | 5 210           | 7,703½      | 3.87          | 375-80            | 350       | 273          | —                            |
| 7219                                                         | Doris of Klana                  | Mrs. B. G. Neumann, Hampden         | Jersey   | 3/3/30       | 11 —            | 7,023       | 5.27          | 370-23            | 350       | 273          | —                            |
| 15074                                                        | Lotus of Oakhill                | Mrs. B. G. Neumann, Hampden         | "        | 23/2/30      | 9 2             | 6,744       | 5.37          | 361-95            | 350       | 273          | —                            |
| 11653                                                        | Gayboy's Sunflower of Wangara   | Inspe.-Gen of Hospitals, Northfield | M.S.     | 10/10/29     | 9 278           | 8,883       | 4.04          | 358-65            | 350       | 273          | —                            |
| 14706                                                        | Kyby Bonny                      | Government Farm, Kybybolite         | Ayrshire | 2/3/30       | 5 22            | 8,588½      | 4.14          | 355-88            | 350       | 273          | —                            |
| 15184                                                        | Blackbank Alleyne               | Government Farm, Kybybolite         | "        | 28/9/29      | 5 292           | 8,448       | 4.17          | 351-98            | 350       | 273          | —                            |
| 9006                                                         | Oakbank of Kybybolite           | Government Farm, Kybybolite         | "        | 17/10/29     | 10 305          | 8,169       | 4.29          | 350-13            | 350       | 273          | —                            |
| 5296                                                         | Royal's Tot of Illawarra        | E. & A. Nicholls, Woodville         | M.S.     | 22/10/29     | 8 61            | 9,299½      | 3.76          | 348-98            | 350       | 273          | —                            |
| 14563                                                        | Lady's Tot of Illawarra         | M. Cowan, Murray Bridge             | "        | 22/10/29     | 8 341           | 8,394       | 4.10          | 344-18            | 350       | 273          | —                            |
| 4904                                                         | Solanum of Springhurst          | W. P. Eckermann, Eudunda            | Jersey   | 9/12/29      | 16 101          | 6,906       | 4.87          | 336-60            | 350       | 273          | —                            |
| 9009                                                         | Countess of Kybybolite          | Government Farm, Kybybolite         | Ayrshire | 7/2/30       | 10 244          | 6,544½      | 4.34          | 331-84            | 350       | 273          | —                            |
| 13047                                                        | Liesanthe of Kybybolite         | Government Farm, Kybybolite         | "        | 22/11/29     | 6 52            | 7,648½      | 4.07          | 331-80            | 350       | 273          | —                            |
| 5844                                                         | Pet III. of Beana Vista         | E. & A. Nicholls, Woodville         | M.S.     | 22/12/30     | 10 —            | 10,204½     | 3.21          | 327-39            | 350       | 273          | —                            |
| 17929                                                        | Lady Alice of Fernden           | E. O. Traeger, Eudunda              | Jersey   | 23/10/29     | 5 9             | 6,761       | 4.75          | 320-43            | 350       | 273          | —                            |
| 14573                                                        | Warsaw II. of Loch Willow Farm  | H. B. Kuchel, Murray Bridge         | M.S.     | 18/11/29     | 8 226           | 7,935       | 4.02          | 319-03            | 350       | 240          | Dried off                    |



PURE-BRED COWS COMPETING TEST BETWEEN JULY 1ST, 1930, AND DECEMBER 31ST, 1930—continued.

| Herd<br>Book<br>No.                               | Name of Cow.                              | Owner.                                   | Breed.   | Date<br>Calved. | Age<br>at<br>Calving. | Total<br>Milk. | Aver-<br>age<br>Test. | Total<br>Butter-<br>fat. | Stand-<br>ard. | Days<br>Tested. | Remarks.                     |
|---------------------------------------------------|-------------------------------------------|------------------------------------------|----------|-----------------|-----------------------|----------------|-----------------------|--------------------------|----------------|-----------------|------------------------------|
|                                                   |                                           |                                          |          |                 |                       |                |                       |                          |                |                 |                              |
|                                                   |                                           |                                          |          |                 | Yrs. Days.            | Lbs.           | %                     | Lbs.                     | Lbs.           |                 |                              |
| MATURE COWS—BUTTERFAT STANDARD 35 LBS.—continued. |                                           |                                          |          |                 |                       |                |                       |                          |                |                 |                              |
| 6520                                              | Bohemian Maid of Linden .....             | W. A. Rodda, Salisbury .....             | Jersey   | 31/10/29        | 10 178                | 5,728½         | 5.23                  | 299.57                   | 350            | 273             | —                            |
| 9018                                              | Buby of Kybybolite .....                  | Government Farm, Kybybolite .....        | Ayrshire | 22/2/30         | 10 225                | 7,333½         | 4.08                  | 299.47                   | 350            | 273             | —                            |
| 13432                                             | Flirt of Ben Lomond .....                 | Inspecc. Gen. of Hosp., Northfield ..... | M.S.     | 20/12/29        | 6 319                 | 7,026          | 4.12                  | 289.65                   | 350            | 273             | —                            |
| 6049                                              | Lady Marie 4th of Penrhyn .....           | T. B. Brooka, Clarendon .....            | Jersey   | 31/10/29        | 13 83                 | 5,436          | 5.30                  | 287.43                   | 350            | 273             | —                            |
| 16826                                             | Leslie Fowler 4th of Willow<br>Farm ..... | A. J. Marrett, Saddleworth .....         | "        | 2/1/30          | 6 187                 | 5,359          | 4.90                  | 286.86                   | 350            | 273             | —                            |
| 1052                                              | Bosey 53rd of Lilydale .....              | H. T. Kleemann, Mypolonga .....          | Friesian | 4/12/29         | 9 342                 | 7,590          | 3.53                  | 268.28                   | 350            | 210             | Owner withdrawn<br>from test |
| 1582                                              | Henley Duchess Netherland ..              | H. T. Kleemann, Mypolonga .....          | "        | 8/11/29         | 7 61                  | 8,940          | 3.09                  | 265.50                   | 350            | 240             | Owner withdrawn<br>from test |
| 15336                                             | Duchess of Klama .....                    | J. M. Hudd, Bletchley .....              | Jersey   | 15/12/29        | 11 158                | 5,265          | 5.01                  | 263.55                   | 350            | 180             | Dried off                    |
| 15066                                             | Joy of Glenarnagh .....                   | R. J. Hague, Clare .....                 | "        | 23/11/29        | 6 172                 | 4,290          | 5.68                  | 248.73                   | 350            | 240             | Withdrawn                    |
| 11993                                             | Lovely II. of Arrawatta .....             | J. J. Farrow, Gawler .....               | M.S.     | 30/9/29         | 11 132                | 5,353½         | 4.36                  | 233.63                   | 350            | 273             | —                            |
| 1236                                              | Henley Plus Poch .....                    | H. Mountstephen, Monteth .....           | Friesian | 31/1/30         | 8 69                  | 7,080          | 3.11                  | 220.48                   | 350            | 150             | Owner withdrawn<br>from test |
| 15208                                             | Oakbank Beuchan .....                     | J. O. Robinson, Meadows .....            | Ayrshire | 11/2/30         | 8 57                  | 6,040½         | 3.58                  | 216.55                   | 350            | 273             | —                            |
| 10597                                             | Rhonda of Merliden .....                  | W. S. McAuliffe, Eudunda .....           | Jersey   | 10/2/30         | 10 78                 | 3,510          | 5.09                  | 178.61                   | 350            | 120             | Temp. exemption              |
| 13408                                             | Amara of Kybybolite .....                 | Government Farm, Kybybolite .....        | Ayrshire | 6/6/30          | 6 143                 | 3,770          | 4.64                  | 174.78                   | 350            | 180             | Withdrawn                    |
| 17013                                             | Gem 16th of Darbalara .....               | H. B. Kuchel, Murray Bridge .....        | M.S.     | 4/3/30          | 5 135                 | 4,650          | 3.71                  | 172.67                   | 350            | 210             | Dried off                    |
| 20818                                             | West Kilbride right Bloom .....           | H. D. Secomb & Son, Two Wells ..         | Ayrshire | 12/2/30         | 6 241                 | 3,945          | 4.21                  | 166.11                   | 350            | 150             | Owner withdrawn<br>from test |
| 11646                                             | Gayboy's Dora of Wangara .....            | Inspecc. Gen. of Hosp., Northfield ..    | M.S.     | 26/10/29        | 9 81                  | 4,011          | 4.00                  | 160.40                   | 350            | 273             | —                            |
| 10590                                             | Princess III. of Willow Farm ..           | A. J. Marrett, Saddleworth .....         | Jersey   | 28/7/30         | 10 238                | 3,165          | 4.91                  | 155.53                   | 350            | 90              | Withdrawn                    |
| 17928                                             | Bungarook May .....                       | J. M. Bray, Langhorne's Creek .....      | "        | 3/6/30          | 7 71                  | 3,075          | 4.64                  | 151.83                   | 350            | 120             | Sold                         |
| 14662                                             | Somerset's Model of Wangara ..            | H. B. Kuchel, Murray Bridge .....        | M.S.     | 29/6/30         | 8 153                 | 4,365          | 3.31                  | 144.70                   | 350            | 150             | Withdrawn                    |
| 16841                                             | Mayflower of Hampden .....                | J. A. J. Patner, Hampden .....           | Jersey   | 12/8/30         | 6 176                 | 2,670          | 4.74                  | 126.47                   | 350            | 60              | Withdrawn                    |
| 2095                                              | Barlura Woodcrest Della .....             | L. H. & P. C. Giffa, Auburn .....        | Friesian | 3/9/30          | 5 281                 | 3,980          | 3.17                  | 125.63                   | 350            | 90              | Dried off                    |
| 2407                                              | Cliffside Flower Rosey .....              | H. T. Kleemann, Mypolonga .....          | "        | 6/5/30          | 6 94                  | 3,720          | 3.20                  | 119.06                   | 350            | 60              | Owner withdrawn<br>from test |
| 8354                                              | Iris of Grantala .....                    | J. H. Dawkins, Gawler .....              | Jersey   | 18/7/30         | 9 347                 | 2,340          | 4.50                  | 105.36                   | 350            | 60              | Sold                         |
| 17141                                             | Angas Adeline II. .....                   | J. O. Robinson, Meadows .....            | Ayrshire | —               | 13                    | 1,950          | 3.58                  | 69.81                    | 350            | 60              | Withdrawn                    |
| 13687                                             | Gayboy's Duchess of Wangara ..            | H. B. Kuchel, Murray Bridge .....        | M.S.     | 12/6/30         | 9 123                 | 1,590          | 3.45                  | 54.78                    | 350            | 60              | Withdrawn                    |
| 5438                                              | Molly 3rd of Hill View .....              | A. Snell, Bolivar .....                  | I.M.S.   | 19/9/30         | 8 5                   | 1,470          | 3.18                  | 46.80                    | 350            | 30              | Dead                         |

Correction re Roseworthy Lady II. shown in previous half-yearly list as a Senior Three-year-old, but should have been shown as a Senior Two-year-old. Amended figures are as follows:—

|       |                          |                                  |        |         |       |       |      |        |     |     |   |
|-------|--------------------------|----------------------------------|--------|---------|-------|-------|------|--------|-----|-----|---|
| 23619 | Roseworthy Lady II. .... | Agrie. College, Roseworthy ..... | Jersey | 23/5/29 | 2 271 | 5,076 | 5.09 | 289.05 | 225 | 273 | — |
|-------|--------------------------|----------------------------------|--------|---------|-------|-------|------|--------|-----|-----|---|



## IMPORTATION OF RUSSIAN WHEAT INTO THE UNITED KINGDOM.

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Early in December the Agent-General for South Australia reported that he had been able to obtain much information which could be accepted as thoroughly reliable on the subject of the importation of Russian wheat into the United Kingdom. He intimated that a great deal of press and other publicity upon the matter had been tinged with political bias, and much of it could not be accepted as a reliable statement of the true position. There was a considerable difference of opinion as to whether or not Russia had been dumping wheat on the United Kingdom markets. The question, of course, depended entirely upon the interpretation given to the word "dumping." Without doubt large quantities had been landed in the United Kingdom in 1930. To the end of September the amount of wheat imported was only 45 per cent. of the total importation, but the Agent-General understood that during October nearly as much wheat came into the country from Russia as during the whole of the earlier part of the year, and that the amount received during November was approximately the same as that which came in during October. Imports from Russia were likely to cease during the winter months. Although this was stated in sections of the press to be due to the exhaustion of home supplies he was advised that it was really due to the closing of Russian ports, and that export will, without question, be resumed with the coming of spring and the re-opening of ports. There could be no doubt that the present unsatisfactory wheat position was not wholly due to the shipping of large quantities by Russia. There would seem to be a consensus of opinion amongst the leading merchants that the present position was largely an economic one. The high price paid for wheat following the war encouraged increased production, and the position was that production largely exceeded demand. This unbalanced position naturally tended to lower values, but there were other factors. The action of the Canadian Wheat Pool and the United States Farm Board in withholding supplies from the market last year, with a consequent heavy carry-over, had further aggravated the position. The United States export to Russia of large quantities of agricultural implements and machinery was also a contributory factor, as it necessitated the establishment of large credits abroad and Russia had adopted the present means to enable her to pay for her purchases. It was generally known that consumption in Europe, Canada, and the United States was very stable, and any change in the market up or down does not materially affect consumption, but in countries where a large proportion of the population was more or less on the starvation line, *e.g.*, China and Japan, a change in the market might perhaps be reflected in the demand position in those countries. The general position was certainly disastrous, and, so long as the world supply position remains in its present state, no hopes of any improvement are entertained. Competent market opinion was that low values would continue to rule for a long time to come.

While it was stated that Russian competition was unfair, this could not be definitely proved as particulars of production costs were not available. Russia's pre-war position as an important supplier of wheat must also be considered. The war and the results of the revolution caused the cessation of her exports for some years, but it was only to be expected that she would, as soon as the need arose and the opportunity offered, endeavor to regain her former position in the supply world. Of the exports this season the greater quantity had been sold on forward terms to United Kingdom buyers, and only relatively small quantities had come forward unsold. The price of Russian wheat sold in the United Kingdom had been comparatively low, and there can be no doubt that the low selling value had materially affected the United Kingdom markets, and would continue to do so.



*Imports of Wheat into United Kingdom from the principal sources of supply, together with total imports from all sources in the calendar years 1912 and 1913 and 1913 and 1920 to 1929:—*

|                     | 1912.                 | 1913.   | 1920.   | 1921.  | 1922.  | 1923.<br>(1,000's of cwts.) | 1924.   | 1925.  | 1926.  | 1927.   | 1928.   | 1929.   |
|---------------------|-----------------------|---------|---------|--------|--------|-----------------------------|---------|--------|--------|---------|---------|---------|
| Argentina .....     | 18,784                | 14,756  | 30,831  | 4,186  | 18,804 | 21,026                      | 24,022  | 11,960 | 11,899 | 19,452  | 24,399  | 45,378  |
| Chile .....         | 556                   | 765     | —       | 323    | —      | 3                           | 1,784   | 897    | 246    | —       | 49      | 3       |
| China .....         | —                     | —       | 330     | 538    | —      | not separately quoted       | —       | —      | —      | —       | —       | —       |
| Germany .....       | 316                   | 447     | —       | —      | —      | —                           | 7       | 2,057  | 2,243  | 285     | 1,564   | 1,676   |
| Japan .....         | —                     | —       | 2,420   | 1,300  | —      | not separately quoted       | —       | —      | —      | —       | —       | —       |
| Persia .....        | 538                   | 10      | —       | —      | —      | 345                         | 121     | —      | —      | 62      | 123     | 3       |
| Roumania .....      | 697                   | 39      | —       | —      | —      | not separately quoted       | —       | —      | —      | —       | —       | —       |
| Russia .....        | 9,005                 | 5,011   | 2       | —      | —      | 151                         | 753     | 1,265  | 2,268  | 2,459   | 82      | —       |
| U.S.A. ....         | 19,974                | 34,068  | 45,422  | 36,065 | 37,262 | 31,321                      | 30,321  | 26,509 | 31,183 | 35,619  | 23,662  | 22,266  |
| Australia .....     | 11,909                | 10,127  | 19,966  | 20,109 | 16,335 | 4,654                       | 10,871  | 16,306 | 9,186  | 14,838  | 10,233  | 12,797  |
| Canada .....        | 21,551                | 21,788  | 10,189  | 14,589 | 22,910 | 28,437                      | 38,769  | 29,677 | 35,670 | 32,181  | 41,005  | 27,191  |
| British India ..... | 25,379                | 18,766  | 20      | 2,660  | 488    | 12,523                      | 9,816   | 7,324  | 2,695  | 5,014   | 1,546   | 141     |
| Uruguay .....       | not separately quoted | —       | —       | —      | —      | 25                          | 172     | 36     | —      | 49      | 169     | 16      |
| New Zealand .....   | not separately quoted | —       | —       | —      | —      | 48                          | —       | —      | —      | 1       | 35      | 99      |
| Total all sources . | 109,573               | 105,878 | 109,328 | 80,479 | 96,374 | 100,467                     | 117,421 | 96,854 | 96,256 | 110,436 | 103,577 | 111,767 |

*Imports of Wheat during October, 1928, 1929, and 1930, and for ten months ended 31st October for these years, are:—*

|                     | Month ended October 31st. |                |                | Ten Months ended October 31st. |                |                |
|---------------------|---------------------------|----------------|----------------|--------------------------------|----------------|----------------|
|                     | 1928.<br>cwts.            | 1929.<br>cwts. | 1930.<br>cwts. | 1928.<br>cwts.                 | 1929.<br>cwts. | 1930.<br>cwts. |
| U.S.A. ....         | 2,128,275                 | 2,238,921      | 2,565,197      | 18,948,167                     | 18,458,318     | 18,747,962     |
| Argentina .....     | 686,718                   | 6,564,355      | 151,695        | 20,817,703                     | 37,898,217     | 13,650,866     |
| British India ..... | 922                       | 98,278         | 495,495        | 1,548,412                      | 141,072        | 3,016,290      |
| Australia .....     | 589,482                   | 1,041,087      | 909,432        | 9,803,431                      | 12,057,191     | 10,823,603     |
| Canada .....        | 3,163,749                 | 1,454,013      | 1,984,469      | 32,321,405                     | 23,788,611     | 21,476,574     |
| Other countries ... | 407,107                   | 553,012        | 3,769,443      | 1,375,318                      | 3,144,059      | 13,080,596     |

It is of interest to note that imports from Russia to the end of September amounted to 3,471,990cwts. Of the imports for October from "Other Countries" shown above, 3,294,000cwts. were received from Russian sources. The figures for November were not available, but it was understood that imports from Russia for that month were, approximately, the same as those for October.



## THE HILLS HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                      | Butterfat.           |                     |                      | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|---------------|
|          |                              |                              | Per Herd during Dec. | Per Cow during Dec. | Per Cow July to Dec. | Per Herd during Dec. | Per Cow during Dec. | Per Cow July to Dec. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                 | Lbs.                 | Lbs.                | Lbs.                 | %             |
| 7/D ...  | 25-49                        | 20-81                        | 16,908               | 637.33              | 4,144.54             | 709.69               | 28.01               | 174.60               | 4.30          |
| 7/E ...  | 25                           | 22                           | 20,379               | 815.16              | 4,431.38             | 876.73               | 35.07               | 183.71               | 4.30          |
| 7/H ...  | 7-45                         | 6-52                         | 4,961½               | 665.96              | 4,554.29             | 252.70               | 33.92               | 213.62               | 5.09          |
| 7/J ...  | 18                           | 16-74                        | 13,863               | 770.17              | 3,722.71             | 653.67               | 36.32               | 175.24               | 4.72          |
| 7/K ...  | 18                           | 18                           | 15,143½              | 841.31              | 4,829.39             | 665.74               | 36.99               | 208.24               | 4.40          |
| 7/L ...  | 35-68                        | 34-00                        | 24,626               | 690.19              | 3,199.03             | 1,138.14             | 31.90               | 150.23               | 4.62          |
| 7/O ...  | 21                           | 15-61                        | 9,243½               | 440.17              | 2,861.54             | 437.94               | 20.85               | 137.50               | 4.76          |
| 7/S ...  | 14                           | 14                           | 8,556                | 611.14              | 4,281.97             | 436.73               | 31.20               | 227.06               | 5.10          |
| 7/T ...  | 10-87                        | 10-07                        | 5,898                | 542.59              | 3,726.60             | 248.87               | 22.89               | 156.01               | 4.23          |
| 7/V ...  | 9                            | 8                            | 9,222½               | 1,024.72            | 2,185.94             | 432.14               | 48.02               | 102.28               | 4.69          |
| 7/W ...  | 21                           | 21                           | 18,290               | 870.95              | 4,214.44             | 840.48               | 40.02               | 189.82               | 4.60          |
| 7/X ...  | 16                           | 16                           | 11,408               | 713.00              | 4,625.69             | 500.73               | 31.30               | 194.35               | 4.89          |
| 7/Y ...  | 21                           | 19-42                        | 12,361½              | 578.75              | 2,977.95             | 575.19               | 26.92               | 142.05               | 4.65          |
| 7/Z ...  | 10                           | 3-58                         | 2,704                | 270.40              | 2,390.95             | 126.27               | 12.63               | 108.71               | 4.67          |
| 7/AA ... | 8                            | 7-10                         | 4,889                | 611.12              | 2,393.63             | 241.55               | 30.19               | 146.80               | 4.91          |
| 7/BB ... | 15                           | 10-84                        | 10,567½              | 704.50              | 3,581.23             | 452.75               | 30.18               | 145.90               | 4.28          |
| 7/DD ... | 12                           | 9-87                         | 7,057                | 588.08              | 4,127.99             | 337.43               | 28.12               | 203.22               | 4.78          |
| 7/EE ... | 26                           | 21-42                        | 12,268½              | 471.86              | 2,866.19             | 522.64               | 20.10               | 121.53               | 4.26          |
| 7/GG ... | 14                           | 14                           | 8,540½               | 610.03              | 2,969.74             | 447.26               | 31.95               | 152.84               | 5.24          |
| 7/HH ... | 17                           | 13                           | 8,323½               | 489.62              | 3,369.08             | 358.92               | 21.11               | 146.10               | 4.31          |
| 7/II ... | 13                           | 12-03                        | 5,950                | 457.69              | 3,077.91             | 278.43               | 21.42               | 145.78               | 4.68          |
| 7/FF ... | 11                           | 11                           | 8,850½               | 804.59              | 5,498.80             | 382.41               | 34.76               | 235.92               | 4.82          |
| Means .  | 16.75                        | 14.77                        | 10,909.59            | 651.34              | 3,703.62             | 496.20               | 29.62               | 166.76               | 4.54          |

## NARRUNG HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1930.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                      | Butterfat.           |                     |                      | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|---------------|
|          |                              |                              | Per Herd during Dec. | Per Cow during Dec. | Per Cow Oct. to Dec. | Per Herd during Dec. | Per Cow during Dec. | Per Cow Oct. to Dec. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                 | Lbs.                 | Lbs.                | Lbs.                 | %             |
| 5/C ...  | 30                           | 25-39                        | 16,994               | 566.47              | 1,723.34             | 775.25               | 25.84               | 82.12                | 4.56          |
| 5/D ...  | 31                           | 24                           | 14,585½              | 482.63              | 1,697.28             | 821.17               | 27.10               | 88.42                | 5.63          |
| 5/E ...  | 36-68                        | 33-39                        | 17,046½              | 464.73              | 1,641.39             | 834.83               | 22.76               | 83.51                | 4.90          |
| 5/J ...  | 25                           | 24-52                        | 8,667½               | 347.90              | 1,427.20             | 499.45               | 19.98               | 77.84                | 5.74          |
| 5/O ...  | 25                           | 25                           | 17,050               | 682.00              | 2,195.87             | 804.08               | 35.76               | 115.18               | 5.24          |
| 5/R ...  | 56-19                        | 54-03                        | 24,565½              | 437.26              | 1,401.77             | 994.36               | 17.70               | 60.05                | 4.05          |
| 5/S ...  | 30                           | 23-26                        | 14,412½              | 480.42              | 1,677.34             | 684.63               | 22.82               | 82.50                | 4.75          |
| 5/T ...  | 24                           | 20-71                        | 14,422               | 600.92              | 1,909.68             | 584.87               | 24.37               | 84.85                | 4.06          |
| 5/U ...  | 20                           | 14-81                        | 12,105½              | 605.28              | 2,189.13             | 521.82               | 26.09               | 97.16                | 4.31          |
| 5/Y ...  | 27                           | 24-26                        | 17,254               | 639.04              | 1,966.18             | 897.40               | 33.24               | 101.68               | 5.20          |
| 5/Z ...  | 29                           | 23-71                        | 24,998               | 861.59              | 2,716.56             | 1,219.42             | 42.05               | 128.98               | 4.88          |
| 5/AA ... | 18                           | 13-97                        | 8,752                | 486.22              | 1,209.11             | 420.35               | 23.35               | 62.35                | 4.80          |
| 5/CO ... | 34                           | 27-26                        | 8,948                | 263.18              | 1,372.65             | 382.70               | 11.26               | 61.02                | 4.28          |
| 5/DD ... | 21-97                        | 18-32                        | 10,768               | 505.71              | 1,731.11             | 551.35               | 25.90               | 89.36                | 5.12          |
| 5/EE ... | 15                           | 15                           | 9,594½               | 639.63              | 2,029.98             | 424.34               | 28.29               | 95.98                | 4.42          |
| 5/II ... | 27-29                        | 25-32                        | 21,245½              | 778.51              | 2,432.16             | 951.68               | 35.97               | 110.72               | 4.62          |
| 5/JJ ... | 27                           | 25-68                        | 14,294               | 529.41              | 2,199.35             | 648.93               | 24.03               | 100.72               | 4.54          |
| 5/KK ... | 23-71                        | 18-71                        | 11,935               | 503.37              | 1,491.92             | 516.26               | 21.77               | 66.43                | 4.33          |
| 5/MM ... | 14                           | 11-85                        | 7,916½               | 565.46              | 1,790.08             | 395.98               | 27.57               | 92.80                | 4.88          |
| 5/NN ... | 27                           | 26-84                        | 17,894               | 662.74              | 1,933.41             | 786.24               | 29.12               | 85.04                | 4.39          |
| 5/OO ... | 22-81                        | 21-39                        | 13,752½              | 602.91              | 1,868.42             | 581.03               | 25.47               | 88.08                | 4.22          |
| Means .  | 26.89                        | 24.14                        | 14,629.48            | 544.09              | 1,818.11             | 686.01               | 25.51               | 86.90                | 4.69          |



## LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1930.

| Herd No.    | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     | Butterfat.           |                     | Average Test. |
|-------------|------------------------------|------------------------------|----------------------|---------------------|----------------------|---------------------|---------------|
|             |                              |                              | Per Herd during Dec. | Per Cow during Dec. | Per Herd during Dec. | Per Cow during Dec. |               |
|             |                              |                              | Lbs.                 | Lbs.                | Lbs.                 | Lbs.                | %             |
| 1/B .....   | 20                           | 19                           | 9,780½               | 489.03              | 420.18               | 21.01               | 4.30          |
| 1/C .....   | 18                           | 18                           | 9,300                | 516.67              | 392.74               | 21.82               | 4.22          |
| 1/F .....   | 24                           | 23.16                        | 16,522               | 688.42              | 743.33               | 30.97               | 4.50          |
| 1/H .....   | 22.55                        | 21.10                        | 10,352               | 459.07              | 485.65               | 19.32               | 4.21          |
| 1/O .....   | 16.84                        | 16.84                        | 10,338½              | 613.92              | 494.75               | 29.38               | 4.79          |
| 1/R .....   | 22                           | 18.84                        | 5,284                | 240.18              | 337.58               | 15.34               | 6.39          |
| 1/U .....   | 19.71                        | 15.06                        | 7,558½               | 383.48              | 296.53               | 15.04               | 3.92          |
| 1/W .....   | 23.39                        | 19.45                        | 12,061               | 515.62              | 557.75               | 23.85               | 4.62          |
| 1/Y .....   | 15                           | 13.29                        | 9,284½               | 618.97              | 372.66               | 24.84               | 4.01          |
| 1/Er .....  | 47.19                        | 37.23                        | 24,150               | 511.76              | 1,042.71             | 22.10               | 4.32          |
| 1/I .....   | 33                           | 32                           | 25,978               | 787.21              | 1,099.73             | 33.33               | 4.23          |
| 1/KK .....  | 28                           | 20.52                        | 17,579½              | 627.84              | 742.65               | 26.52               | 4.22          |
| 1/LL .....  | 22.10                        | 20.52                        | 14,682               | 664.34              | 626.42               | 28.34               | 4.27          |
| 1/MM .....  | 15                           | 11                           | 5,239                | 349.27              | 245.88               | 16.39               | 4.69          |
| 1/OO .....  | 18                           | 10.08                        | 9,544½               | 530.25              | 431.29               | 23.96               | 4.52          |
| 1/PP .....  | 20                           | 16.19                        | 12,163½              | 608.18              | 542.21               | 27.11               | 4.46          |
| 1/QQ .....  | 26                           | 25.58                        | 21,511               | 827.35              | 889.38               | 34.21               | 4.13          |
| 1/RR .....  | 24                           | 24                           | 20,243               | 843.46              | 831.22               | 34.63               | 4.11          |
| 1/SS .....  | 26.32                        | 26.10                        | 27,658½              | 1,050.85            | 1,090.67             | 41.44               | 3.94          |
| 1/TT .....  | 18.71                        | 18.10                        | 9,485                | 506.94              | 413.85               | 22.12               | 4.36          |
| 1/UU .....  | 38.87                        | 38.61                        | 22,348               | 574.94              | 940.34               | 24.19               | 4.21          |
| Means ..... | 23.75                        | 21.20                        | 14,336.33            | 603.72              | 616.55               | 25.96               | 4.30          |

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THE ADELAIDE CHEMICAL & FERTILIZER CO. LTD.

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

Competitors.	Address.	Score for Month ending January 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Williams, W. R.	Frewville	(1) *	(2) *	(3) *	—
Williams, W. R.	Frewville	(4) 129	(5) 146	(6) *	275
Williams, W. R.	Frewville	(7) 173	(8) 189	(9) 231	593
Wilkinson, F. W.	Lower Light	(10) 203	(11) 164	(12) *	367
Wilkinson, F. W.	Lower Light	(13) 200	(14) 210	(15) *	410
Pearman, E. D.	Rosewater	(16) 142	(17) *	(18) *	142
Pearman, E. D.	Rosewater	(19) 185	(20) 181	(21) 172	538
Langmead, E. R.	Croydon	(22) *	(23) *	(24) 173	173
Burton, C. J. C.	Mallala	(25) 203	(26) 181	(27) 207	591
Heath, H. E.	Mile End.	(28) 208	(29) *	(30) 171	379
Heath, H. E.	Mile End.	(31) 166	(32) 157	(33) 114	437
Gurr, A. & H.	Scott's Creek	(34) 148	(35) 181	(36) 202	531
Howard, T. W.	Woodville	(37) 175	(38) 148	(39) 180	503
Osborn, E. L.	Camden	(40) *	(41) 205	(42) 183	393
Curtis, W. R.	Cottonville	(43) 147	(44) 210	(45) 190	547
Gameau, V. F.	Woodville	(46) 178	(47) 192	(48) 152	522
Gameau, V. F.	Woodville	(49) 189	(50) 144	(51) 173	506
Aird, J. R. & Son	Kilkenny	(52) 150	(53) 189	(54) 193	532
Simpson, Mrs. A. M.	Fullarton Estate ..	(55) *	(56) 131	(57) *	131
Barrett, L.	Angaston	(58) 151	(59) 163	(60) 189	503
Barrett, L.	Angaston	(61) *	(62) 124	(63) 199	323
Barrett, L.	Angaston	(64) 168	(65) 133	(66) 157	458
Lamerton, E. A.	Edwardstown	(67) 143	(68) 89	(69) 200	432
Wiese, W.	Cabra	(70) 232	(71) 207	(72) 137	626
Wiese, W.	Cabra	(73) 196	(74) 198	(75) 185	579
Bishop, O. W.	Clarence Park	(76) 189	(77) 139	(78) 182	510
Urlwin, A. P.	Balaklava	(79) *	(80) †	(81) 180	180
Riggs, N.	Camden Park	(82) 221	(83) 178	(84) *	399
Riggs, N.	Camden Park	(85) 194	(86) 145	(87) 182	521
Hutton, M. E.	Clarence Park	(88) 179	(89) 201	(90) 213	593
Andrewartha, A. H.	Underdale	(91) 138	(92) 190	(93) 195	523
Vowels, C. C.	Westbourne Park ..	(94) †	(95) 175	(96) *	175
Vowels, C. C.	Westbourne Park ..	(97) 216	(98) 193	(99) †	409
Vowels, C. C.	Westbourne Park ..	(100) 209	(101) *	(102) *	209
Vowels, C. C.	Westbourne Park ..	(103) 171	(104) *	(105) *	171
Manuel, T. C.	Myrtle Bank	(106) 156	(107) 172	(108) 200	528
Manuel, T. C.	Myrtle Bank	(109) 161	(110) 228	(111) *	389
Harris, W. A.	Edwardstown	(112) 209	(113) 185	(114) *	394
Harris, W. A.	Edwardstown	(115) 185	(116) 169	(117) 161	515
Hill, W.	Knoxville	(118) 178	(119) 197	(120) 166	561
Hill, W.	Knoxville	(121) 194	(122) 190	(123) 185	569
McFarlane, A. S.	Kilkenny	(124) 159	(125) *	(126) 124	283
Hutchinson, A. S.	Athelstone	(127) *	(128) 202	(129) 190	392
Hutchinson, A. S.	Athelstone	(130) 43	(131) 183	(132) 180	406
Gavin, C. G.	Salisbury	(133) 187	(134) 193	(135) 222	602
Gavin, C. G.	Salisbury	(136) 212	(137) 202	(138) 198	607
Thomas, C. R.	Hectorville	(139) 198	(140) 184	(141) 141	523

Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.

Competitors.	Address	Score for Month ending January 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Compton, R. C.	Woodeforde	(142) 156	(143) 189	(144) 187	532
Connor, D. C.	Gawler	(145) 107	(146) †	(147) 134	241
Robinson, A. E.	Hectorville	(148) 230	(149) †	(150) 206	436
Vann, R. S.	New Hindmarsh ...	(151) 161	(152) 152	(153) 121	434
McLean, J. G.	Black Forest	(154) 125	(155) 137	(156) 136	398
Fidge, H.	Clarence Park	(157) 159	(158) 156	(159) *	315
Fidge, H.	Clarence Park	(160) 139	(161) 162	(162) 201	502
Tolhurst, A. E.	Torrens Park	(163) 155	(164) 131	(165) *	286
Tolhurst, A. E.	Torrens Park	(166) 141	(167) 154	(168) 136	431
Monkhouse, A. J.	Woodside	(169) 158	(170) 197	(171) *	355
Monkhouse, A. J.	Woodside	(172) *	(173) *	(174) 188	188
Monkhouse, A. J.	Woodside	(175) 185	(176) *	(177) *	185
Monkhouse, A. J.	Woodside	(178) *	(179) *	(180) 148	148
Sage, H. R.	Nuriootpa	(181) 138	(182) *	(183) 178	316
Mitchell, W. J.	Woodside	(184) 198	(185) *	(186) 218	416
George, L. E.	Redfern	(187) 189	(188) 212	(189) 156	557
George, L. E.	Redfern	(190) 205	(191) 190	(192) *	395
George, L. E.	Redfern	(193) 152	(194) 186	(195) 191	529
George, L. E.	Redfern	(196) 171	(197) 201	(198) 202	574
Aird, J. R., & Son	Kilkenny	(199) 181	(200) 199	(201) *	380
Aird, J. R., & Son	Kilkenny	(202) 157	(203) 164	(204) 159	480
Gameau, V. F.	Woodville	(205) 166	(206) 147	(207) 165	478
Totals		10,158	9,445	8,923	28,526

Section 3.—Black Orpingtons.

Competitors.	Address.	Score for Month ending January 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Aird, J. R., & Son	Kilkenny	(208) 141	(209) 105	(210) 175	421
Aird, J. R., & Son	Kilkenny	(211) 143	(212) 155	(213) *	298
Williams, W. R.	Frewville	(214) 168	(215) 199	(216) 173	540
Williams, W. R.	Frewville	(217) †	(218) *	(219) 158	158
Curr, A. and H.	Scott's Creek	(220) *	(221) *	(222) *	—
Andrewartha, A.	Underdale	(223) *	(224) 183	(225) 192	375
McFarlane, A. S.	Kilkenny	(226) 196	(227) 171	(228) 153	520
Connor, D. C.	Gawler	(229) *	(230) 174	(231) *	174
Gillick, W. J.	New Hindmarsh ...	(232) 100	(233) *	(234) *	100
Osborn, E. L.	Camden	(235) 141	(236) 201	(237) 180	522
Totals		889	1,188	1,031	3,108

Section 4.—Rhode Island Reds.

Competitors.	Address.	Score for Month ending January 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Gameau, V. F.	Woodville	(238) 140	(239) 166	(240) 115	421
Fidge, H.	Clarence Park	(241) 179	(242) 191	(243) 82	452
Totals		319	357	197	873

* Disqualified, Rule 12, underweight eggs.

† Dead.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, January 28th, 1931. There were present:—Messrs. F. Coleman (Chairman), H. N. Wicks (Vice-Chairman), P. H. Jones, H. S. Taylor, P. J. Baily, S. Shepherd, A. J. Cooke, A. L. McEwin, R. H. Martin, Prof. A. J. Perkins (Director of Agriculture), Dr. A. E. V. Richardson (Director Waite Research Institute), Mr. W. R. Birks (Principal Roseworthy Agricultural College), and Mr. H. C. Pritchard (Secretary).

Agents' Commission on Superphosphate.—The Committee appointed at the November meeting waited on the manufacturers on November 28th. Mr. F. Coleman said that the superphosphate manufacturers held out very little hope of being able to supply superphosphate at a reduced price during this season. Concession would be made to farmers who returned bags for refilling. The Secretary was instructed to get in touch with the Superphosphate Association for a formal reply to the request of the Committee.

Export of Pig Meat.—Information concerning exports of pig meat to London from Victoria was received, and the Secretary intimated that the report had been submitted to the Narridy Branch, from which the original question was asked. The letter from the Victorian department, written on December 4th, read:—"The quantity shipped from Victoria this season totals 5,040 carcasses—50 in September, 705 in October, and 4,284 in November. From inquiries made, it appears that pork is not shipped on consignment. The usual method of doing this business is to get cabled quotations and effect sales on same prior to shipment. At the moment, the best price offering from London is 7½d. per lb. for carcasses weighing from 60lbs. to 110lbs., with an average of 80lbs. This range of light weights is for consumption as pork. The cost of killing, preparing, and shipping comes to 2d. per lb., so that the price in Melbourne would be equal to 5½d. per lb. for porkers. The best offer from London for bacon weights, weighing from 120lbs. to 160lbs. carcass weight, is 6½d. per lb. The cost in this case also comes to about 2d., leaving 4½d. per lb. as the value in Melbourne. In both cases, it is understood that the quality is to be of the best."

Reduction in Agent Charges for Handling Wheat.—The Secretary stated that the Lameroo Conference resolution dealing with this was brought under the notice of the Chamber of Commerce and the Wheat Pool and that the handling charges had been reduced by ½d. per bushel.

Accounts for Cream Supplies.—The Redhill Branch submitted a resolution "strongly objecting to the present system of not showing expenses in making up accounts on cream supplies." This was submitted to Mr. Barlow, who states that "Previous to the Dairy Act becoming law the method of payment was to pay for an estimated amount of commercial butter. This estimation was based on the weight of the cream and the percentage of butterfat it contained, and a chart was used to indicate the amount of butter to be paid for. Under this system, a gross price was quoted and all expenses were then taken off. With practically all factories these deductions were comparable and were arrived at and fixed by a committee representing the manufacturing interests. When it was made compulsory for the factories to pay for cream on the butterfat basis, the usual procedure which applies practically throughout the world was adopted. That is to say, the factories fix a net price which they are willing to pay for butterfat and no expenses are shown, the manufacturing expenses, &c., being allowed for when fixing the net price. Departmentally, we have no control over this price as it is expected to be kept as high as possible by competition, and I must say that up to the present the prices fixed have been at least comparable. The reason that no manufacturing expenses are shown when paying for butterfat is that the butterfat is not the manufactured article, and the difference between the butterfat and

commercial butter (usually in the ratio of about 100 to 120) is used to pay part at least of the expenses. Either system, if under supervision, can be expected to give approximately the same net results, but it is practically impossible to show or charge manufacturing expenses if the payment is made for butterfat. The system at present in vogue is accepted throughout the world with the exception of New South Wales and Queensland." It was decided to advise the Redhill Branch accordingly.

Life Membership.—Life membership of the Agricultural Bureau was conferred upon Messrs. A. F. Herbert (Nantawarra), J. R. Coles (Longwood), A. S. Burgess (Water-vale), and J. Burton (Beetaloo Valley).

New Members.—The following names were added to the rolls of existing Branches:—Port Elliot—L. O. Hill; Waddikee Rocks—R. Scott, E. Rossiter, G. A. Graph; Mundalla—C. Hyde; Wallala—A. K. Weepers, A. Miller, J. McIntyre; Mount Pleasant—W. H. Johns; Kapinnie—A. Harvey, D. C. Wannan; Koonunga—V. Kindler, U. Gallasch, F. H. Schulz, A. Zwar; Wirrilla—P. O. Jacka, H. Jacka; Monarto South—P. O. Schenscher; Wolseley—I. Makin; Pinnaroo Women's—Mrs. F. G. Bonnin; Yeelanna—S. C. Shaw, H. O. Clements, J. W. Payne; Lamerloo—R. A. Jenkins; Parilla Women's—Mrs. L. Foale; Kangarilla—Roy H. Strickland; Langhorne's Creek—E. Dodd, I. Dodd; Tintinara—T. Ingliss; Scott's Bottom—H. Lohmueller; Strathalbyn—E. H. Woolfit, Dr. C. E. Willing; Two Wells—R. T. Murrell; Upper Wakefield—Alex. Anderson. Total number of members, 8,400; number of new members, 34; total number of branches, 305.

Conferences.—The Secretary intimated that Conferences of the Agricultural Bureau would be held at Lyndoch (Lower North) on Thursday, February 26th, and at Wirrabara (Mid-North) on Wednesday, March 11th. The Chairman promised to attend at Lyndoch.

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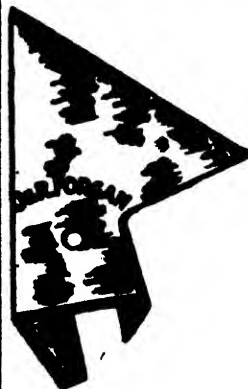
Year by year the ALFA LAVAL has led the way—each New Model has been by far the Best Separator in its day, but the 1930 New Model is far ahead of anything ever made before.

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DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported:—

BUTTER.—The production at the beginning of last month declined and it became necessary to import moderate quantities of top grade butters from the eastern States; but since then quantities have steadied, and with the purchasing power of the public generally being restricted, there has been almost sufficient local butter for requirements. In lower grades, however, there is a surplus, and this is going forward to London from week to week. From this out, however, quantities will decline as usual at this time of the year. Owing to the acute rises in the exchange position, markets for butter in the eastern States firmed each week, and this was reflected from time to time in values here. At date the following quotations ruled:—Choiceest creamery fresh butter, in bulk, 1s. 6½d.; prints and delivery extra; second and third grades, 1s. 4½d. (These prices are subject to the stabilization levies.) Best separators, 1s. 2½d. to 1s. 3½d.; well-conditioned store and collectors', 11d. to 1s.; heated and pastry, 10d.

EGGS.—These also have shown a seasonable decline, and many of the consignments were variable in quality and careful attention was necessary in the testing and grading before sales could be effected. As the demand at present is more particularly for prime quality guaranteed eggs, there was a weakening demand for other sorts, but there was no alteration in values recorded. Ordinary country eggs, hen 5½d. per dozen, duck 6½d. per dozen; selected tested and infertile higher.

CHEESE.—The South-Eastern factories maintained quantities throughout the month under review. Local and Western Australian demand continued steady, so that clearances were effected each week. Rates firmed a point in sympathy with the hardening in butter values, and at date are as follows:—New makes, large to loaf, 7d. to 7½d. per lb.; semi-matured and matured, to 11d. per lb.

ALMONDS.—The new season's crop is now being marketed in limited quantities and the quality so far seems to be good. Demand continues sufficient to absorb lots as they came forward, and with little alteration in rates. Kernels, however, came in for better call, and are selling freely. Brandis, 7½d. to 7½d.; mixed softshells, 7d.; hardshells, 4d. to 4½d.; kernels, 1s. 6½d. to 1s. 7d. per lb.

HONEY.—This commodity is not moving out at all freely, and with heavy stocks held in all warehouses, buyers have been less eager to purchase than usual. The demand for lower grade is almost negligible even at low prices. Prime clear extracted, in liquid condition, 3½d. to 3½d.; best quality candied lots, 2½d. to 3½d.; second grade, 1½d. to 2d. per lb.

BEESWAX.—Moderate supplies, fair demand; 1s. 4d. to 1s. 4½d. per lb., according to sample.

BACON.—Curers have been able to obtain ample supplies of live hogs from the various markets, and consequently the quantities of bacon offering have been ample for all needs. Considering the times, the turnover has been well maintained, but an increasing call for bacon factory smallgoods resulted, which is usual during the summer months. Hams are in fair request. Best local sides, 9½d. to 10d.; best local factory cured middles, 8d. to 9d.; large, 7½d.; local rolls, 9½d. to 10d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 2d.; local hams, 1s. to 1s. 1d.; cooked, 1s. 3d.; "Sugar Cane" brand lard in packets 11d., in bulk 10d. per lb.; local prints, 10½d. per lb.

LIVE POULTRY.—The quantities marketed so far this year have not been so great as usual, and evidently the farmers have been keeping the hens so as to augment incomes from the eggs produced. Light-conditioned birds eased in values, but prime quality cockerels continued in good request. Values for ducks ruled lower than just previously and turkeys also are lower in values than was the case at Christmas time. Prime roosters, 4s. 9d. to 6s. 4d.; nice-conditioned cockerels, 3s. 6d. to 4s. 6d.; fair-conditioned cockerels, 2s. 8d. to 3s. 4d.; chickens lower. Heavy-weight hens, 3s. 3d. to 4s. 3d.; medium hens, 2s. 4d. to 3s. 1d.; light hens, 1s. 8d. to 2s. 3d.; couple of pens of weedy sorts lower. Geese, 3s. 8d. to 4s. 9d.; prime young Muscovy drakes, 3s. 6d. to 4s. 10d. Ducks, good-conditioned, 2s. 8d. to 3s. 4d.; do., fair condition, 1s. 9d. to 2s. 5d.; ducklings lower. Turkeys, good to prime condition, 11d. to 1s. 3d. per lb. live weight; do., fair condition, 8d. to 10d. per lb. live weight; do., fattening sorts, lower. Pigeons, 4½d. to 5½d. each.

POTATOES.—New local potatoes, 5s. 6d. to 6s. per cwt.

ONIONS.—New white or brown, 6s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC. NOVEMBER, 1930.

IMPORTS.


Interstate.

Apples (bushels)	234
Bananas (bushels)	18,867
Cherries (bushel)	1
Citrus—	
Lemons (bushels)	693
Oranges (bushels)	38
Passion fruit (bushels)	56
Pawpaws (bushel)	1
Pineapples (bushels)	718
Peanuts (bags)	198
Do. kernels (bags)	8
Carrots (bags)	8
Cucumbers (bushels)	409
Onions (bag)	1
Potatoes (bags)	19,321
Bulbs (packages)	55
Plants (packages)	24
Seeds (packages)	84
Trees, fruit (packages)	2
Wine casks (number)	2,410
<i>Fumigated—</i>	
Citrus—Lemons (bushels)	518
Trees, fruit (packages)	2
Wine casks (number)	7
<i>Rejected—</i>	
Bananas (bushels)	12
Pineapples (bushels)	3
Cucumbers (bushels)	2
Potatoes (bags)	4
Second-hand cases (number)	2

Overseas.

(State Law.)

Wine casks (number)	697
<i>Fumigated</i> —Wine casks (number)	75



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THIS WAY & WITH THIS MACHINE
THE MONKEY GRUBBER

Is the unrivalled method of clearing land. Of special design, and constructed to give great power in a compact and portable unit, trees and stumps are pulled cleanly, leaving less roots and snags to run. A Rope Shortener, together with simple and complete sturdy rope fittings, make extra savings in time.

Yields move up and costs come down.

ADELAIDE STOCKISTS—Australasian Implement Co., Colton Palmer & Preston, Harris Scarfe Ltd., McPhersons Pty. Ltd., South Australian Farmers' Union.

A PRODUCT OF THE JACK PEOPLE
TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.

IMPORTS AND EXPORTS—*Continued.*

Federal Quarantine Act.

	Packages.	Lbs.
Seeds, &c.	4,654	379,602
Plants	1	No. 28
Timber	82,578	Super ft. 2,437,391

EXPORTS.

Federal Commerce Act.

New Zealand—Oranges (packages)	82
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DECEMBER, 1930.

IMPORTS.

Interstate.

Apples (bushels)	13
Apricots (bushel)	1
Bananas (bushels)	5,877
Citrus—	
Grape fruit (bushel)	1
Lemons (bushels)	571
Oranges (bushels)	16
Passion fruit (bushels)	42½
Peaches (bushel)	1
Pineapples (bushels)	79
Tomatoes (bushels)	1
Peanuts (bags)	61
Do. kernels (bags)	15
Beans (bags)	10
Potatoes (bags)	11,740
Bulbs (packages)	33
Plants (packages)	30
Seeds (packages)	36
Wine casks (number)	2,405
Fumigated—	
Citrus—Lemons (bushels)	462
Wine casks (number)	23
Steamed—Second-hand bags (number)	4,000
Rejected—	
Apples (bushel)	½
Bananas (bushels)	12
Second-hand cases (number)	35

OVERSEAS.

(State Law.)

Wine casks (number)	666
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Federal Quarantine Act.

	Packages.	Lbs.
Seeds, &c.	2,648	253,615
Plants	1	No. 4
Tea chests	150	150
Battans	15	15
Timber	102,787	Super ft. 1,792,677

EXPORTS.

Federal Commerce Act.

England—Almonds (packages)	5
Mixed fruit (packages)	7

"..... fire has a disinfecting, sweetening, and mellowing effect on 'new' land, which cannot economically be given in any other way"—said Mr. Spafford, Deputy Director of Agriculture.

In burning stubble the use of a Horwood-Bagshaw Fire Rake is infinitely to be preferred to the ordinary "running burn." Where the stubble is thin the rake will keep the burn going, and is not inclined to be as patchy as a running burn. Again, with a Fire Rake, it is not as necessary to be so careful in the choice of a day for burning. In new country the intensified heat from a Fire Rake will scorch roots, suckers, and shoots, which a running burn is inclined to miss. Further, the Fire Rake, in passing over the ground, misses nothing, collects and burns all the sticks and rubbish, and, in addition, gives the ground a light cultivation stroke.

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The HORWOOD - BAGSHAW

Stump-Jump Fire Rake

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of January, 1931, also the average precipitation to the end of January, and the average annual rainfall.

Station.	For Jan. 1931.	Av. to end Jan.	Av'ge Annual Rain-fall.
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FAR NORTH AND UPPER NORTH.

Oodnadatta	—	0.61	4.72
Marree	0.04	0.42	5.86
Farina	0.05	0.52	6.46
Copley	0.03	0.58	7.93
Beltana	0.04	0.68	8.59
Blinman	0.07	0.94	12.02
Hookina	0.09	0.53	11.51
Hawker	0.10	0.60	12.28
Wilson	0.10	0.82	11.84
Gordon	0.09	0.65	10.73
Quorn	0.14	0.66	13.42
Port Augusta	0.11	0.53	9.43
Bruce	0.15	0.47	9.94
Hammond	0.20	0.63	11.41
Wilmington	0.16	0.83	17.63
Willowie	0.10	0.50	12.11
Melrose	0.14	1.18	23.01
Booleeroo Centre	0.10	0.76	15.26
Port Germein	0.11	0.63	12.47
Wirrabara	0.25	0.68	19.34
Appila	0.18	0.64	14.69
Cradock	0.05	0.61	10.87
Carrieton	0.08	0.78	12.40
Johnsburg	0.07	0.60	10.64
Eurelia	0.09	0.79	13.06
Orroroo	0.13	0.99	13.28
Nackara	—	0.71	11.16
Black Rock	0.13	0.71	12.50
Oodlawirra	0.13	—	—
Peterborough	0.31	0.84	13.30
Yongala	0.36	0.67	14.46

NORTH-EAST.

Yunta	0.33	0.62	8.46
Waukaringa	0.05	0.51	8.06
Mannahill	—	0.66	8.31
Cockburn	0.11	0.62	7.93
Broken Hill, N.S.W.	0.05	0.70	9.61

LOWER NORTH.

Port Pirie	0.04	0.63	13.25
Port Broughton	0.17	0.60	14.02
Bute	0.14	0.57	15.48
Laura	0.16	0.71	18.11
Caltowie	0.18	0.70	16.85
Jamestown	0.18	0.69	17.84
Gladstone	0.13	0.67	16.40
Crystal Brook	0.12	0.66	15.87
Georgetown	0.10	0.68	18.47
Narridy	0.13	0.56	15.93
Redhill	0.31	0.57	16.63
Spalding	0.18	0.63	19.34
Guinere	0.24	0.67	18.74
Yacka	0.26	0.61	15.35
Koolunga	0.40	0.60	15.52
Snowtown	0.46	0.59	15.70

LOWER NORTH—continued.

Brinkworth	0.56	0.51	15.85
Blyth	0.75	0.67	16.86
Clare	0.69	0.86	24.61
Mintaro	0.45	0.62	23.43
Watervale	0.82	0.91	27.10
Auburn	0.43	0.97	24.08
Hoyleton	0.22	0.73	17.44
Balaklava	0.51	0.68	15.61
Port Wakefield	0.72	0.56	13.04
Terowie	0.41	0.71	13.47
Yarcowie	0.42	0.69	13.72
Hallett	0.44	0.70	16.47
Mount Bryan	0.21	0.56	16.79
Koorunga	0.35	0.74	17.96
Farrell's Flat	0.35	0.74	18.75

WEST OF MURRAY RANGE.

Manoora	0.32	0.61	18.94
Saddleworth	0.42	0.75	19.60
Marrabel	0.30	0.72	19.87
Riverton	0.23	0.76	20.81
Tarlee	0.20	0.77	18.13
Stockport	0.34	0.74	16.81
Hamley Bridge	0.26	0.77	16.60
Kapunda	0.31	0.83	19.85
Freeling	0.37	0.73	17.95
Greenock	0.38	0.77	21.68
Truro	0.25	0.72	20.09
Stockwell	0.30	0.69	20.18
Nuriootpa	0.32	0.76	20.65
Angaston	0.36	0.78	22.49
Tanunda	0.45	0.83	22.12
Lyndoch	0.48	0.74	23.58
Williamstown	0.57	0.88	27.71

ADELAIDE PLAINS.

Owen	0.39	0.44	13.91
Mallala	0.55	0.71	16.67
Roseworthy	0.53	0.71	17.38
Gawler	0.60	0.72	19.06
Two Wells	0.66	0.65	15.81
Virginia	0.62	0.68	17.23
Smithfield	0.55	0.53	17.51
Salisbury	0.53	0.70	18.60
Adelaide	0.64	0.72	21.12
Glen Osmond	0.51	0.93	26.06
Magill	0.54	0.85	25.61

MOUNT LOFTY RANGES.

Teatree Gully	0.53	0.84	27.53
Stirling West	1.28	1.54	46.90
Uraidla	0.96	1.35	44.11
Clarendon	0.59	1.10	32.91
Morphett Vale	0.33	0.77	22.69
Noarlunga	0.16	0.60	20.40
Willunga	0.21	0.78	26.02
Aldinga	0.07	0.58	20.25

RAINFALL—continued.

Station.	For Jan. 1931.	Av. to end Dec.	Av'ge Annual Rain- fall.
MOUNT LOFTY RANGES—contd.			
Myponga	0.49	0.74	29.14
Normanville	0.16	0.56	20.73
Yankalilla	0.13	0.57	22.95
Mount Pleasant ..	0.83	0.83	27.29
Birdwood	0.69	1.02	29.28
Gumeracha	0.73	1.07	33.45
Millbrook Reservoir	0.57	1.13	35.55
Tweedvale	0.73	1.01	35.96
Woodside	1.02	0.97	32.38
Ambleside	1.10	1.09	35.02
Nairne	1.38	0.93	28.22
Mount Barker	1.56	1.02	31.71
Echunga	0.93	1.06	33.29
Macclesfield	1.94	0.88	30.62
Meadows	1.08	1.05	36.34
Strathalbyn	1.02	0.70	19.41

MURRAY FLATS AND VALLEY.			
Meningie	0.27	0.63	18.46
Milang	0.51	0.62	15.05
Langhorne's Creek ..	0.72	0.46	14.80
Wellington	0.89	0.71	14.64
Tailem Bend	1.33	0.46	14.66
Murray Bridge	0.72	0.56	13.76
Callington	0.87	0.67	15.31
Mannum	0.67	0.50	11.53
Palmer	0.54	0.45	15.55
Sedan	0.29	0.36	12.16
Swan Reach	0.18	0.38	10.65
Blanchetown	0.28	0.67	11.14
Eudunda	0.30	0.69	17.13
Sutherlands	0.37	0.35	10.79
Morgan	0.26	0.51	9.17
Waikerie	0.25	0.35	9.61
Overland Corner ..	0.14	0.47	10.50
Loxton	0.25	0.50	11.60
Renmark	0.17	0.47	10.52

WEST OF SPENCER'S GULF.			
Eucla	0.09	0.61	9.96
Nullarbor	0.02	0.38	8.62
Fowler's Bay	0.48	0.37	11.76
Penong	0.17	0.32	11.94
Koonibba	0.35	0.30	11.64
Denial Bay	—	0.29	11.31
Ceduna	0.10	0.23	9.82
Smoky Bay	0.31	0.25	10.44
Wirrulla	0.02	—	—
Streaky Bay	0.31	0.41	14.91
Chandada	0.12	—	—
Minnipa	0.20	0.65	13.73
Kyancutta	0.37	—	—
Talia	0.48	0.26	14.76
Port Elliston	0.59	0.38	16.47
Yeelanna	0.22	0.24	16.03
Cummins	0.16	0.41	17.71
Port Lincoln	0.09	0.55	19.45
Tumby	0.47	0.28	14.14
Ungarra	0.64	0.29	16.83
Carrow	0.73	0.31	13.38
Arno Bay	0.70	0.38	12.46

Station.	For Jan. 1931.	Av. to end Dec.	Av'ge Annual Rain- fall.
WEST OF SPENCER'S GULF—contd.			
Rudall	0.66	0.58	12.07
Cleve	1.34	0.50	14.61
Cowell	0.32	0.46	11.16
Miltalie	1.12	0.51	13.59
Darke's Peak ..	0.55	0.59	14.98
Kimba	0.08	0.37	11.50

YORKE PENINSULA.			
Walleroo	0.27	0.53	13.94
Kadina	0.29	0.51	15.71
Moonta	0.36	0.50	15.10
Paskeville	0.25	0.49	15.64
Maitland	0.55	0.61	19.97
Ardrossan	0.56	0.48	14.00
Port Victoria ..	0.62	0.45	15.44
Curramulka	0.55	0.57	17.92
Minlaton	0.40	0.51	17.90
Port Vincent	0.52	0.41	14.56
Brentwood	0.23	0.35	15.52
Stansbury	0.47	0.56	16.89
Warooka	0.23	0.44	17.60
Yorketown	0.19	0.47	16.98
Edithburgh	0.23	0.50	16.44

SOUTH AND SOUTH-EAST.			
Cape Borda	0.28	0.60	24.76
Kingscote	0.05	0.45	19.05
Penneshaw	0.46	0.43	18.65
Victor Harbor ..	0.39	0.69	21.33
Port Elliot	0.32	0.66	20.02
Goolwa	0.45	0.65	17.87
Copeville	0.42	0.37	11.58
Meribah	0.17	0.12	11.34
Alawoona	0.34	0.52	9.98
Mindarie	0.18	0.54	11.88
Sandalwood	0.45	0.56	13.67
Karoonda	0.62	0.50	14.37
Pinnaroo	0.34	0.43	14.70
Parilla	0.62	0.45	13.95
Lameroo	0.54	0.55	16.19
Parrakie	0.47	0.45	14.52
Geranium	0.37	0.47	16.49
Peake	0.47	0.55	16.30
Cooke's Plains ..	0.34	0.54	15.47
Coomandook	0.32	0.50	17.34
Coonalpyn	0.37	0.66	17.51
Tintinara	0.24	0.50	18.81
Keith	0.72	0.42	17.93
Bordertown	0.21	0.72	19.35
Wolseley	0.22	0.60	18.41
Frances	0.77	0.68	19.94
Naracoorte	1.31	0.79	22.58
Penola	2.14	1.02	26.15
Lucindale	1.51	0.70	23.07
Kingston	1.09	0.72	24.37
Robe	0.76	0.79	24.61
Beachport	1.24	0.88	26.97
Millicent	1.42	0.96	29.79
Kalangadoo	2.19	1.18	32.34
Mount Gambier ..	1.49	1.35	30.74

* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Feb.	Mar.			Feb.	Mar.
Alawoons	*	—	—	Budunda	*	2	2
Aldinga	*	—	—	Burella	*	14	14
Allendale East	†	27	—	Burrella Women's	*	4	4
Alma	*	—	—	Beverard East	*	—	—
Amyton	*	—	—	Farrell's Flat	*	27	27
Angaston	*	—	—	Finniss	*	—	—
Appila	*	—	—	Gawler River	*	—	—
Appila-Yarrowie	*	6	6	Georgetown	*	28	—
Arthurton	789	—	—	Geranium	*	28	28
Ashbourne	*	25	—	Gladstone	*	27	—
Auburn	*	—	—	Gladstone Women's	782	18	18
Auburn Women's	782	27	27	Glencoe	*	10	10
Balaklava	*	23	23	Glossop	*	—	—
Balhannah	*	—	—	Goode	*	5	5
Barmera	*	—	—	Goode Women's	*	—	—
Bestaloo Valley	788	2	30	Greenock	†	9	9
Belalie North	788	2	2	Green Patch	*	26	—
Belalie Women's	782	—	—	Gulnare	*	—	—
Berri	*	4	4	Gumeracha	†	2	2
Big Swamp	*	—	—	Halidon	*	—	—
Blackheath	795	5	5	Hanson	*	—	4
Black Rock	*	3	—	Hartley	*	—	3
Black Springs	*	—	—	Hawker	*	3	—
Blackwood	*	—	9	Hookina	*	—	—
Block E	*	—	—	Hoyleton	*	16	16
Blyth	788	20	20	Inman Valley	*	19	19
Boaleroo Centre	*	27	—	Ironbank	*	—	—
Booigun	*	—	—	Jamestown	*	18	18
Boora Plains	†	5	5	Kalangadoo Women's	783	14	14
Borrika	*	—	—	Kalangadoo	*	10	10
Bowhill	*	—	—	Kalyan	*	18	18
Brentwood	*	5	5	Kangarilla	†	—	—
Brinkley	*	4	4	Kangarilla Women's	783	—	19
Brinkworth	789	2	2	Kanmantoo	*	—	—
Brownlow	*	—	—	Kanni	†	—	—
Buchanan	*	—	—	Kapinnie	*	—	—
Bugle	792	10	10	Kapunda	*	13	13
Bundaleer Springs	*	—	—	Karcultaby	*	—	—
Bunora	*	3	4	Karoonda	*	4	4
Bute	*	19	19	Keith	*	26	—
Butler	*	—	—	Kelly	*	28	—
Calca	*	—	—	Ki Ki	*	—	—
Cadell	*	—	—	Kilkerran	790	26	—
Caliph	*	3	3	Kongorong	*	2	2
Calitowie	*	—	—	Koolunga	*	—	—
Canowie Belt	*	—	—	Koonibba	*	26	—
Caralue	791	25	—	Koonunga	*	2	2
Carrow	*	—	4	Koppio	*	2	2
Chandada	*	—	—	Kringin	*	2	2
Charra	*	—	—	Kulkawirra	*	10	10
Cherry Gardens	795	—	—	Kyancutta	*	3	3
Cianfield	*	—	—	Kybybolite	*	3	3
Clare	*	3	3	Lameroo	*	—	—
Clarendon	*	2	2 & 31	Langhorne's Creek	*	28	—
Cleve	*	5	5	Laura	*	25	—
Cobdogla	*	—	—	Laura Bay	791	7	7
Coolie	*	4	4	Lenswood and Forest Range	*	10	10
Colton	*	—	—	Light's Pass	789	2	2
Coomandook	*	27	27	Lipson	*	28	—
Coomalpyne	*	—	—	Lone Gum and Monash	*	—	4
Coomawarra	*	5	5	Lone Pine	*	—	—
Coorabie	*	—	—	Longwood	†	—	—
Copeville	*	—	—	Lowbank	*	—	4
Coulta	*	—	—	Loxton	*	18	18
Cradock	*	—	—	Lyndale	*	—	—
Cummins	†	13	13	Lyndoch	789	8	8
Cungena	*	—	—	McLaren Flat	795	—	—
Currency Creek	*	2	2	MacGillivray	*	8	3
Cygnet River	*	—	—	Mallala	*	16	16
Darke's Peak	*	—	—	Mattee	†	26	—
Dudley	*	—	—	Mangalo	*	—	—
Edithville	*	—	—	Mannanarie	*	—	—
Elbow Hill	†	10	10				

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Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Feb.	Mar.			Feb.	Mar.
Marama	*	R	—	Roberts and Verran	*	—	—
Meadows	*	—	4	Rockwood	*	2	2
Meribah	*	9	9	Rosedale	*	—	—
Milang	*	14	14	Roseworthy	*	—	—
Milendilla	*	26	—	Rosy Pine	*	—	—
Millicent	*	27	27	Rudall	*	3	3
Millicent Women's	*	—	—	Saddlesworth	*	6	6
Miltalie	*	7	7	Saddlesworth Women's	*	3	3
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Modbury	*	—	—	Sandalwood	*	—	—
Monarto South	*	—	—	Scott's Bottom	*	28	—
Moonta	*	—	—	Shoal Bay	795	3	3 & 31
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Moorkook	*	—	—	Snowtown	788	13	13
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Morphett Vale	*	—	—	Spalding	*	—	—
Mount Barker	*	—	4	Springton	*	4	4
Mount Bryan	*	—	—	Stirling	*	—	—
Mount Compass	795	6	5	Stockport	*	—	—
Mount Gambier	788	13	13	Strathalbyn	*	3	3 & 31
Mount Hope	*	3	3	Streaky Bay	*	27	27
Mount Pleasant	795	—	—	Tallem Bend	*	5	5
Mount Remarkable	*	—	—	Talia	*	27	27
Mount Schank	*	—	—	Tantanoola	788	7	7
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Murraytown	*	—	—	Tarlee	*	—	—
Mypolonga	*	—	—	Tatara	*	—	—
Myra	*	—	4	Thrington	*	—	—
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Owen	*	27	—	Warcowie	*	R	3
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Parilla Well	*	2	2	Wasleys Women's	785	5	5
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Pinkawillie	†	—	—	Wirrabara	*	—	—
Pinnaroo	784	—	—	Wirrilla	*	R	—
Pinnaroo Women's	*	6	6	Wirrilla Women's	*	5	5
Poochera	*	R	R	Wirrulla	*	18	18
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Pygery	*	28	—	Wudinna	†	—	—
Quorn	*	—	—	Wynarka	*	—	—
Rameo	795	2	2	Yacka	*	—	—
Rapid Bay	795	12	12	Yadnarie	791	3	3
Redhill	788	—	—	Yallunda Flat	*	—	—
Rendelsham	*	28	28	Yandiah	*	18	13
Renmark	*	—	—	Yanine	*	—	—
Rhyne	*	—	—	Yantanable	*	—	—
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Riverton	*	R	9	Yorketown-Melville	*	—	—
Riverton Women's	*	—	—	Younghusband	*	—	—
				Yurgo	*	—	—

* No report received during the month of January.

† Held over.

R In recess.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

WOMEN'S BRANCHES.

AUBURN WOMEN'S (Average annual rainfall, 24.08in.).

The meeting of January 30th was held at the residence of Miss Dennison. Sister Thomas gave an interesting paper, "Home Nursing," and Mrs. Giles read an article, "Diets in the Home." Twelve members and two visitors attended. (Secretary, Miss Dennison.)

BELALIE WOMEN'S (Average annual rainfall, 17.84in.).

Meeting held September 9th. Mrs. Mitchell presided over an attendance of 21 members and three visitors. Conveners were appointed for different sections to assist with the Bureau exhibit for the local show. Mrs. M. Baily gave an instructive paper, "Home Nursing." (Secretary, Mrs. E. L. Orchard, Jamestown.)

October 14th.—Present: 23 members and 30 visitors.

Mrs. I. Warnes, of Burra, gave an instructive address, "The Work of the Country Women's Association."

At the meeting held on November 11th, reports were received from delegates who represented the Branch at the Annual Congress. (Secretary, Mrs. E. Orchard, Jamestown.)

GLADSTONE WOMEN'S (Average annual rainfall, 16.40in.).

January 9th.—Present: 14 members.

DRESSMAKING.—Miss M. Brown read the following paper:—"Nowadays most women do a fair amount of their own dressmaking; even if it does not run to their particular frocks, they have a 'shot' at their morning frocks, especially those for summer wear. Even if we are proud of making our own clothing, we do not want everybody to know it is home-made, and, worse still, looks home-made. First of all, obtain a good pattern. *Cutting out* is the most important and cannot be done in five minutes. If the material is not cut out correctly the finished article cannot be expected to be satisfactory. Have a clear table, scissors and pins; use the best pins, to avoid marks in silk fabrics. Pin all patterns on the material first (because it would not be very pleasing if one proceeded with the cutting out first and then discovered not sufficient material). If it is a plain material, one can save a great deal, by placing the shoulder seams together, but in case of some printed materials and velvet, all patterns must run the same way. It is best to have the frock fitted and then pressed with the stitching, following the directions with the pattern. Finishing off counts for a great deal. Press the seams as the frock is being made. This point is very often overlooked. Then, perhaps, the dress is tried on before the finishing touches are added and it is not satisfactory. The sleeves, if there are any, do not set rightly; the collar sticks out; perhaps, if it is a coat, it hangs out at the bottom. The sleeves are usually most difficult to fit. Do not have the armhole too large or too small, and in case of a small armhole, do not try cutting out too much under the arm—let out the seam. To be on the safe side, tack the sleeve in and try on; sometimes the sleeve seem needs to come more towards the front. A few gathers in the sleeve helps a great deal, especially in cases where the wearer's arms are not so slim as they would like them to be, the sleeves pull across here and so split with arm movement, whereas a fullness allows for arm movement—and very few gathers are needed. In case of a collar standing out from the neck at the back, if cut too low it may be remedied by taking more on the shoulder, but first note that it will not interfere with the back in another place. Stretch the collar slightly on the neck at the back. A roll collar will never set satisfactorily if the collar is not stretched slightly on to the neck at the back. Should the back of a costume, coat, or sports

blazer hang out, take a little more on the shoulder seams near the sleeve—not at the neck. In the case of the front of the coat hanging apart at the bottom—this applies to a full length coat—take off at the shoulder seams again, only at the neck this time. *Pressing.*—Weight and time are more to be considered than heat in obtaining the best results. An iron used too cool will shrink the material. Try pressing on a small piece of the material first before the made-up garment, in case marks are left. If this happens, a cloth can be placed between the iron and the material. Velvet must never be pressed on the flat, but seams held at each end and passed over the iron to prevent marking. Another point, when handling velvet, take a cutting of velvet and place between the thumb and finger, holding pile to pile. Fancy crepes are pressed the same way as velvet, but velveteen may be pressed flat. Georgette and woollen fabrics must not be pressed under a damp cloth, where a number of other materials may. In a thick frock of, say, flannel, where there is a flat seam, rub soap on the seam. Very often steaming will improve a last season's frock. To do away with unnecessary fullness, place a damp cloth on the part and place a hot iron on that cloth. A shiney serge skirt may be improved by rubbing with a fine glass paper, not too hard, but just sufficient to roughen the knap and then press. Pressing marks may be removed by steaming. Place the damp cloth on the material, then hold the iron on the cloth for a few seconds, causing steam to rise. Slap the part with the open hand, then brush. Velvet may be restored, by holding over a basin of hot water. *Hints.*—When machine oil comes in contact with material, try stitching a piece of cotton wool on the mark. For a blood stain, put on damp starch and brush off when dry." (Secretary, Miss M. Sargent.)

KALANGADOO WOMEN'S (Average annual rainfall, 32.34in.).

January 10th.—Present: 14 members.

THE USES OF OLD WOOL.—Mrs. G. Ellison read the following paper:—"In these days of depression and lower prices for wool, women on the farm give consideration to the utilization in the home of odd fleeces, such as pet's wool, which are not usually shorn with the others. For this purpose, crossbred wool of a long staple is preferable. First place the wool in a kerosene bucket or copper to scour, adding a little washing soda to the water, and when just warm enough to get your hands into the water, wash well. Sometimes it is necessary to give two or three waters to get the wool nice and clean. Then dry out of doors; spread out on clean bags. When perfectly dry, start the carding or teasing process. For this, drive long nails through a thick piece of wood, in three rows of three, and nail the wood to a table. Then place the wool in lumps on these nails and then, with a comb made of many nails, knocked into another piece of wood, tear at the wool. The process is very simple and does not take long. I recently made a cushion out of wool, and it was quite a success, only that when scouring the wool I put in too much soda, and made it a little yellow." An excellent report of the Annual Congress was tendered by the Secretary, Miss A. Kennedy.

KANGARILLA WOMEN'S.

Seven members attended the meeting held on December 18th, which was devoted to a discussion on matters of local interest. (Secretary, Mrs. Steer.)

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PARILLA WOMEN'S (Average annual rainfall, 14.95in.).

December 17th.—Present: 11 members.

GARDENING.—Mrs. Seidel read the following paper:—"There is no occupation more in accord with all that is best and brightest in the human character than the care of a garden. A lawn is refreshing to the eyes, and after it is covered, needs very little attention. I never water mine more than once or twice a month. As soon as it is long it must be cut to keep it smooth and green; the frost cuts it back a good deal, which makes it appear dead, but a layer of sand makes it shoot out fresh. In the mallee I find it hard work to grow a summer flower garden, but a lawn, roses, petunias, scabious, linaria, carpet of snow, and nasturtiums are easily grown with very little attention. Stocks do well in winter. Every two or three years they can be cut back and will flower profusely. Asters require a lot of water. Perennial asters and daisies are quite all right; the latter can be grown quite successfully here. Cosmos, sunflowers, and carnations also do well and do not need much attention. I never transplant when it is hot; wait for a cool change and cover the seedlings with straw or manure to keep them moist. Zinnias and dahlias do well, but require a lot of water.

USEFUL HINTS FOR THE HOUSEKEEPER.—At the meeting held on January 21st, which was attended by 17 members, the following hints were given:—Drooping flowers may be revived by plunging the stems into boiling water. A little turpentine mixed in black-lead gives the stove a better polish. Place a piece of greased brown paper over pound cake while baking to prevent burning. A little borax in blue water makes clothes a good color. To remove salt from soup, if soup has been salted too freely, boil some slices of raw potato in it for a few minutes, and the salty flavor will disappear. Add a teaspoonful of brown sugar if soup is too salt. To take the shine out of navy blue suits, rub well with strong blue water and press. A profitable way to use candle ends is to mix them with other materials to make floor polish, or placed between two rags and rubbed with a hot iron makes ironing much easier. A few drops of kerosene added to water for washing floors makes a nice glow on the floor. Discarded silk stockings rolled into a ball make a good polisher for mirrors, &c. To get rid of the smell of paint in a newly-painted room, place a handful of hay in a pail of water, and allow it to stand in the room. Ink stains on linen may be removed by dropping tallow from a lighted candle on the stain; let it remain on for a few days, then wash. If the stains are old and patchy, oil of lemon will never fail. A cheap way of preserving eggs. Prepare a solution of quicklime, 3lbs. lime, 1oz. cream of tartar, ½lb. salt, to 6 quarts of water. Allow it to become quite cold and then place in a petrol tin, covering the eggs. Lemon syrup—a cheap and easy recipe: 3lbs. sugar, 1oz. citric acid; on these pour 2 quarts boiling water, and when cold, add one small bottle of essence of lemon. Use a small quantity to a tumbler of water. Mix together 4lbs. clean sand, 4lbs. whiting, and one packet soap extract. This will be found a cheap and good cleaning powder for saucepans, tables, &c. (Secretary, Mrs. Welden.)

PARRAKIE WOMEN'S (Average annual rainfall, 14.52in.).

Fourteen members attended the meeting held on December 16th. The meeting took the form of a Question Box. (Secretary, Mrs. Cabot.)

PINNAROO WOMEN'S (Average annual rainfall, 14.70in.).

September 5th.—Present: 19 members.

The meeting took the form of a Question Box. The following questions were asked and answered:—How to treat diarrhoea in young chickens? *Answer*—Give Epsom salts on bread. Does it harm a cow to milk her until she comes in again? *Answer*—Yes; she will be much better for a few weeks' spell. What is used to make a pound cake very dark? *Answer*—Use the ordinary ingredients, but the longer the cake is baked the darker it becomes. A remedy to stop small green grubs eating off the tops of carrots? *Answer*—Use arsenate of lead as a spray on the plants. What is the best cure for fowls which develop colds in winter? *Answer*—Keep them out of draughty places. What is the best preparation for painting hen roosts?—*Answer*—Waste tractor oil, or, if not procurable, one part of kerosene to three of oil. What will remove phenyl stains from silk? *Answer*—Try new milk. How long should soap be kept to make it a good color. *Answer*—It should be a good color as soon as made, but left to stand four weeks before using. Why is it that the pieces in marmalade go hard and tough after it is a few months old? *Answer*—The pieces were not boiled sufficiently before the sugar was added. Why is it that a sponge on stewed fruit rises better than when the sponge is baked alone? *Answer*—The heat of the fruit helps the sponge to rise quicker.

A demonstration of cutting out a flared skirt was given by Mrs. Jordan at the meeting held on December 5th, which was attended by 13 members and visitors. (Secretary, Mrs. Atze.)

WABCOOWIE WOMEN'S (Average annual rainfall, 12.16in.).

The inaugural meeting of the Branch was held on November 11th. Eleven members were enrolled and officers elected. (Secretary, Mrs. A. Crossman.)

WASLEYS WOMEN'S, January 8th.

HOME DRESSMAKING.—Mrs. Wilson gave a designing and cutting-out demonstration and read the following paper:—"Have only a moderately hot iron for silks, or they will lose their sheen. Always press the seams open first, then if it is desired to bind them together, press afterwards. The successful hang of the frock largely depends on the pressing. The seams of delicate materials should be done with the point of the iron only. To shrink materials, wring a piece of calico out in a basin of water, place on material,



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press until both the cloth and material are dry; go over all the material like this before cutting out. When doing muslin and voiles, press the whole of the material over afterwards on the wrong side when finished. *Machinery.*—See that the machine is well oiled and cleaned. Always thread with a finer cotton on the spool than on the top. Do not watch the needle when machining; watch the foot. To prevent the thread cobbling at the start, see that the cotton is at the back or on the right hand side of the foot. *Notes on Home Dressmaking: Purchasing.*—It is always more economical to choose a style before purchasing material. By doing this, one can then purchase what material is required. People so often buy a dress length of from three to four yards, take it to a dressmaker, choose the style and find they need half a yard or so of another material for trimming. Before cutting out be sure of the pattern. Buy a good pattern, measure it carefully, and alter it to suit your figure. A good, perfectly plain pattern is the best. It can be altered to suit any style or design. 1. To lengthen a bodice and skirt, cut 2in. above waist line and across hip line, which is 7in. below waist line, and spread. 2. To shorten, tuck pattern between waist and bust line and hip line. 3. To widen at hips and hem, cut pattern 2in. in from armhole to hem and spread. 4. Bust, cut from centre shoulder line to below bust line and spread. Bands and folds are cut on the cross. Frills set better if cut on the cross and half as much again is allowed for gathers. Box pleating is cut on the straight and three times as much allowed as the space to be covered. Kilting is cut on the straight and takes three times as much as the space to be covered. Facings for flared or shaped skirts should be cut to the shape of skirt if a wide facing is required. Usually they are French hemmed, the crosspiece stitched on the right side, turned over, and stitched on the first stitching on the wrong side, leaving a narrow band. Always see that the armhole fits correctly, then try the sleeve in the armhole. If it is the least bit too big to fit the armhole correctly, take it in at the seams. Do not, on any account, have the armhole larger than the sleeve, or the bodice will be out of shape. When putting in the sleeve, start about 3in. towards the front from under the arm seam of bodice, pin around under arm, and holding the bodice so that you are pinning inside, not on the outside, coax the sleeve gently in to place. Often a sleeve which appears quite out of proportion will fit in quite correctly if done in this way. When the sleeve is stitched in, press the seam well open, then take it together again to bind. Most people look to see if their frocks are well finished off inside when they come back from the dressmaker, but the French artists put as little stitching as possible into their frocks, the raw seams are hidden by a loosely fixed lining; and in summer frocks where no lining is used, I have seen the sleeve seams made tidy by hand stitching a piece of Valenciennes lace on to the outside piece of the seam."

Meeting held February 5th. Present: Mrs. E. Day (chair), 35 members, and four visitors. Mrs. P. Maloney, of Roseworthy, gave an address, "Literature." (Secretary, Mrs. M. Wilson.)

WILKAWATT WOMEN'S (Average annual rainfall, 16in. to 17in.).

November 18th.—Present: 11 members and five visitors.

Miss A. Sorrell read a paper, "Cake Making," which was discussed by members. Miss Sorrell also said if red ochre was mixed with linseed oil instead of water, it would have a surface which could be wiped over with a cloth. If roses affected with mildew were sprinkled with the hose and then dusted with sulphur, it would help to check the mildew.

THE KITCHEN GARDEN.—Mrs. A. Young read the following paper at the meeting held on December 16th, there being present 12 members and four visitors:—"One of the worries of the farmer's wife when it comes to preparing the dinner is the difficulty of getting fresh vegetables. Potatoes and onions keep for months if spread out in a cool, dry place. Root vegetables, if bought in quantities, may be kept fresh by burying them and keeping the soil damp. The easiest way of solving the problem is by having a supply growing in the back garden. Beginning with the summer, the nicest green is the bean (the dwarf variety for preference). I find the sparrow is a great nuisance to the tender, young bean plants. In January sow the first early cabbage and cauliflower seeds (a small variety of cabbage that hearts quickly as soon as cool weather commences). Then in April a larger kind can be planted, forming huge hearts, in the middle of winter. Then again in July the late class (such as Drumhead) is a good cabbage, and if kept damp, shows no sign of running to seed. If peas are sown to come ready in the early spring they bear longer and the plants do not dry off so quickly. At the end of winter broad beans may be sown, and if the bean is picked when about half to three-quarter grown, the whole of the bean may be sliced and cooked, and is much preferred by many to the cooked bean seeds. When a salad is wanted for a cold meat tea, what is nicer than lettuce or tomato salad? Lettuces are easily grown in this district through the winter months, but they need plenty of water, and the ground

kept damp all the time, to prevent them from scorching or running to seed, once the hot weather commences. Tomato plants should be planted out early in a spot well sheltered from the wind, and to get early tomatoes a good early variety, such as Early Dwarf, should be planted, with other sorts for later fruiting as well. Beside green vegetables there are plenty of melons and marrows that reward the grower by pleasing supplies. If a good crop of marrows or trombones is secured, the fruit will keep for months if, when picking, a piece of the stem is left attached to it, and then stored in a dry shady place. The seed of root vegetables may be planted at any time in a well-prepared bed which has been watered a fortnight before, and any weeds which have germinated in that time well raked in. This often saves time in hand weeding later. The hard, stiff clay soils need sand mixed with them to make them ideal for the garden, and one should remember, even when the ground has been dug with the fork and nicely turned over, that after a heavy rain, and when the soil has set down hard around the young plants, the hoe is a very useful gardening tool." (Secretary, Mrs. M. Pritchard.)

WILLIAMSTOWN WOMEN'S (Average annual rainfall, 27.71in.).

October 1st.—Present: 10 members.

MY EXPERIENCES WITH A CHAFF COOKER.—Mrs. Wild read the following paper:—"In these days when economy is so urgent, with most housewives looking for every possible means of saving, I think that a chaff cooker is one which would appeal to all cooks who have to buy fuel, whether it be wood, gas, or kerosene. My chaff cooker is made from a small bootbox, lined with paper. I made a bag of cretonne to fit a billycan which holds the food. A billy is better than a saucepan, because there is no handle to bother about. I have fastened the bag to the cretonne lining which goes over the chaff, and pressed the bag with the billy in it into the chaff, making a tight fit. I then made a mat to go into the lid of the box, and saw that the lid fits tightly, making the box quite airtight. I used cocky chaff; it is cheaper, lighter, and I think better than wheaten chaff, because there are no seeds in it, that by the heat and steam that may escape from the billy may start to germinate. I was very dubious of success when I first used it, and so first tried potatoes, which I put into the billy, which fits the cooker, and boiled the potatoes for about eight minutes, and then put the billy with the lid on into the cooker and left it for one and a half hours. They cooked splendidly. The next was some stewed chops; they were put into the billy with chopped onions, pepper (no salt), and other seasoning, and about a teacupful of boiling water, cooked on the stove for about five minutes, just up to the boil, put into the cooker, and left for nearly three hours. This made a beautifully cooked hot tea. Since then I have cooked cabbage, cauliflower, bread and butter pudding, potatoes, and spinach. Putting the spinach into a tin without water and putting the tin into the water in the billy, with the potatoes to be cooked, boiling it for about eight minutes, and then into the cooker, with the result of having both cooked nicely. Rhubarb, prunes, and many other dishes have followed, all with success. Of course, one must use common sense and not expect anything to cook without there is enough heat and enough substance heated, either in shape of food or water, to keep its heat long enough to cook the food. A chaff heater can only conserve the heat; it does not generate it. The principle is the same as a

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thermos flask. Another great saving of fuel is effected in washing-up water. Boil the kettle, pour the water into the billy after you have dished up the meal, and put the billy into the cooker. Put out the fire, and have dinner without bothering about hot water for washing-up. This should appeal to those with wood stoves, as well as any other. If one has a bathheater, especially a chip bathheater, hot water is easily obtained with very little fuel. My chaffbox is such a success that I am making one with three compartments, and have bought aluminium billies for it. One can be used for meat cooking, one for pudding, and one for vegetables; or, if any are not in use, I am making bags filled with chaff to put in so as not to have space for cold air to get into. Aluminium is the best vessel to use; it gets so hot and keeps its heat longer than any other metal, but a good stout tin or an enamel one can also be used. Salt should always be *added* to cooked food, not *cooked* with it."

Meeting held December 3rd.—Mrs. J. Spencer gave an instructive demonstration, "First Aid to the Apparently Drowned," there being present 11 members.

A special meeting was held on January 7th to consider arrangements for the Conference of Lower North Branches of the Agricultural Bureaux to be held at Lyndoch on February 26th. (Secretary, Mrs. Cundy.)

SOUTH-EAST DISTRICT.

MOUNT GAMBIER (Average annual rainfall, 30.82in.).

Mr. E. W. Tollner presided over an attendance of 14 members and 30 visitors at the meeting held on September 5th, when Mr. A. Sassanowsky gave an address, illustrated with lantern slides, depicting views taken on an extensive tour of America. (Secretary, Mr. G. Gurry.)

MUNDALLA (Average annual rainfall, 19.39in.).

Twelve members attended the meeting held on September 10th. Resolutions for the Annual Congress were discussed. An article, "Tractors, Trucks, and Travellers," was read by the Secretary, Mr. A. Ross, and an interesting discussion ensued.

TANTANOOLA.

The monthly meeting of the Branch was held on September 6th. Mr. R. Searle presided over an attendance of 14 members and visitors. The subject, "Flax Growing," was brought forward and discussed. Several members stated that they had obtained seed and intended conducting experiments. (Secretary, Mr. H. Kennedy.)

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEEFALO VALLEY (Average annual rainfall, 23.50in.).

Meeting held September 8th. Present: Mr. H. Cook (Chair), 13 members, and five visitors. Matters of local interest were discussed. (Secretary, Mr. J. Halsce.)

BELALIE NORTH (Average annual rainfall, 17.95in.).

Mr. A. H. Codrington, of the School of Mines, gave a demonstration of wool classing at Mr. F. Carmichael's wool shed, and in the evening delivered an address, "The Wool Industry." (Secretary, Mr. G. Carmichael, Jamestown.)

BLYTH (Average annual rainfall, 16.94in.).

Twenty members and four visitors attended the meeting held on July 25th, when an address, "Farming Fallacies," was delivered by Mr. W. C. Johnston (District Agricultural Instructor). It was decided that future meetings of the Branch should be held on the fourth Friday in each month. (Secretary, Mr. L. Muegge.)

REDHILL (Average annual rainfall, 17.02in.).

Mr. S. Crowther presided over an attendance of 12 members at the meeting held on September 2nd. Mr. H. Crouch read the Departmental Bulletin, "Improving the Farm Flock," which aroused a keen discussion. (Secretary, Mr. S. Pengilly.)

SNOWTOWN (Average annual rainfall, 15.78in.).

Meeting held September 13th. Present: 18 members. The meeting took the form of a Question Box. Several subjects of seasonal interest were introduced, and a good discussion followed. (Secretary, Mr. A. Hocking.)

LOWER-NORTH DISTRICT.**(ADELAIDE TO FARRELL'S FLAT.)****BRINKWORTH** (Average annual rainfall, 16.01in.).

Meeting held September 9th. Mr. E. Ottens presided over an attendance of 20 members. The Secretary (Mr. H. Ottens) read a paper, "How to Reduce the Costs of Wheat Production," and an interesting discussion followed.

LIGHT'S PASS.

September 8th.—Present: 42 members and visitors.

Mr. L. Plush reported on a trip of inspection to the River Murray irrigation settlements in company with Mr. J. B. Harris (District Instructor) and Messrs. F. W. and B. Boehm. Mr. Bert Boehm gave an address on pruning, with special references to competing in local competitions. He pointed out where pruners made mistakes in previous competitions, and mentioned how they could improve their work. His remarks were illustrated by practical work on apricot limbs and branches. On this occasion Messrs. Boehm Bros. (cup winners in the Pruning Competition) entertained the Branch to celebrate their success. (Secretary, Mr. C. Verran.)

LYNDOCH (Average annual rainfall, 23.71in.).

Mr. A. Springbett occupied the chair at the meeting held on September 2nd, which was attended by 15 members. The Agenda Paper of the Annual Congress and local matters were discussed. (Secretary, Mr. J. S. Hammatt, Williamstown.)

NANTAWARRA (Average annual rainfall, 15.90in.).

August 7th.—Present: Seven members.

THE SMALL WOOL CLIP AND ITS PREPARATION.—Mr. R. Uppill read the following paper:—"I advocate making as few lots as possible of fleece wool, having regard to the probable total bales. In a clip from one to two bales up to 10 or 15 bales only pick out the bad or odd fleeces, namely, broken, old, short, tender, kempy, doggy, and spotty fleeces, make them into a lot whether it be bags or a bale, and if not a bale up to 300lbs., put into bags. It is better to make the few outstanding bright fleeces of very best quality into not less than a bale, but be careful in that they are uniform in color, length of staple, character, and of good yield. The fleece should not be skirted too heavily, but take off the stained and sweaty edges first and any fatty ends, such as near the legs, on the forehead, showing stain or uneven length, but do not pull off with those any wool that belongs to the fleece. In a season like the present I advocate taking out the backs, these are not only carrying dirt, but are dry and parched on top, and, like stained pieces, spoil the stronger and cleaner part of the fleece. Bellies, if well put up always command good value; the stained edges and bad pieces should be taken off properly. Most shearers tear off a piece of well-grown wool from the lower ribs; this should be taken off and put with its own class, as it is not belly wool. The belly should be rolled up with the clean side showing and packed in layers. Pieces should be well picked and kept in their class, bad edges should go into their lot. If this rule is adopted throughout, there will be no need for any reclassing, as is sometimes done by the brokers on reaching the store. All small parcels are interlotted, so there is no



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danger in the piece lots being small. Lambs' wool should receive some attention other than stained pieces, the short pieces one easily picked out and bagged, such as the wool from the legs, and any very young lambs that are only 'whitewashed' can go as one lot; here, again, will be found differences of several pence per lb., the moderate length staple can be kept looking fresh, and unless a good number of bales, only pick out the short wool and make one good lot of the other." (Secretary, Mr. N. Robinson.)

September 4th.—Present: Six members.

QUESTION BOX.—Questions were asked by Mr. A. Durdin, who was responsible for the evening. (1) Which makes the better fallow, cultivation or plough? Mr. K. Young preferred cultivating in dry years and plough in wet years. Mr. A. Herbert's experience of cultivated fallow was unsatisfactory. He ploughed shallow in preference to cultivating. (2) Which is the best cereal for hay? Most members favored oats, because it could be grown more cheaply than wheat and hay. Horses were brisker, although care must be taken of their shoulders. One member preferred wheaten hay to oaten hay for feeding long. He stated that there was very little demand for oaten hay outside own farm. (3) What is the best crop rotation for the district? Most members agreed to the three-year rotation—bare fallow, wheat, and grass or oats in preference to wheat for third year, if possible; or a two-year rotation—bare fallow, wheat. Oats were disposed of before the wheat was ready, and the oat stubble made made better feed for stock. Although oats and barley were low in price, costs of production were correspondingly low if they were produced on stubble ground. They had to be guided by the seasons. (4) Class of sheep best suited to a 600-acre farm? A flock of breeding Merino ewes crossed with Dorset ram where conditions were not too wet. In wet districts the coarse and long wool type was better. Closeness to market was another factor to be taken into consideration. (Secretary, Mr. N. Robinson.)

PENWORTHAM.

Meeting held September 4th. Present: 21 members. Mr. C. Goddard, of the School of Mines, gave an address, "The Sheep and Wool Industry." (Secretary, Mr. A. Jenner.)

YORKE PENINSULA DISTRICT.

(TO BUTE.)

ARTHURTON (Average annual rainfall, 16in. to 17in.).

Meeting held September 4th at the residence of Mr. T. Howlett. Mr. Neale, manager of the Maitland branch of the National Bank, gave an instructional address, "Finance." (Secretary, Mr. T. Howlett, Moonta.)

KILKERBAN.

Twenty members and two visitors attended the meeting held on September 2nd, when an address, "The Cultivation of Wheat," was delivered by Mr. W. J. Spafford (Deputy Director of Agriculture). (Secretary, Mr. A. S. Dutschke, Maitland.)

PETERSVILLE.

September 2nd.—Present: 10 members and two visitors.

HOW TO KEEP THE RISING GENERATION ON THE LAND.—Mr. A. Vandepeer contributed the following paper:—"This is a national problem, and one which must be solved if Australia is to make good. The drift toward the cities is primarily responsible for Australia's difficulties to-day, whether financial, political, or industrial. There are too many non-productive citizens for the economic working of a country which is essentially of a productive nature. Farm life must be made more attractive than it has been in the past, so that we can reverse the drift and persuade more people to settle on the land. Farmers should try and make farm life and farm work as attractive as possible to their children, so that there will not be the tendency to drift to the cities. Children should be given an early interest in the working of the farm, and should not be made to work too hard during the school age. Whatever the boys or girls have to do about the farmyard should be of interest to them. If they have to feed poultry, gather eggs, milk cows, or any other such jobs, they should be given a small part of the profit from it, so that the work will be of value to them and not a drudgery. When a boy starts he should not be worked too hard, and should be given reasonable time for recreation, so that he can play games, &c., or indulge in any sport or pastime which he desires. By

doing this he will not become discontented with his life, or desirous of trying something different. Education is of very great importance, and all children should be given a good schooling; and where possible every boy should be taught the rudiments of a trade which will be of use to him, and he can, if he so desires, practise in his spare time. Carpentering or mechanical engineering would be very suitable, and could be put to good use on a farm, as well as providing something different from the ordinary farm work, also making him more efficient than the ordinary unskilled workman in much of the work necessary on a farm." (Secretary, Mr. A. Dutschke, Ardrossan.)

WESTERN DISTRICT.

CARALUE.

Meeting held September 3rd. Present: 16 members. Delegates were appointed to attend the Wudinna Conference, and other matters of local interest were discussed. (Secretary, Mr. E. Marshall.)

LAURA BAY.

Meeting held September 2nd. Present: Mr. E. Barnett (Chair), 18 members, and four visitors. Matters in connection with the Conference of Eyre Peninsula Branches were introduced for discussion. Other subjects of local interest were also discussed. (Secretary, Mr. W. Edson, Ceduna.)

MUDLAMUCKLA.

August 2nd.—Present: 11 members and four visitors.

Mr. Watson gave a report of the wool-classing exhibition given by Mr. Goddard, of the School of Mines. Inquiring as to the best method of dealing with mallee shoots, Mr. Watson told Mr. McGuire that he considered the slasher more effective than the axe. Mr. Parsons said that using the harrows as a fire rake in the stubbles was a good method of ridding the land of shoots. (Secretary, Mr. T. Zippel.)

YADNARIE (Average annual rainfall, 14.09in.).

September 2nd.—Present: 14 members.

INTENSIVE RATHER THAN EXTENSIVE AGRICULTURE.—Mr. J. Deer read the following paper:—"When it is realised that it will soon be no longer possible to extend the boundaries where agriculture can be successfully and profitably conducted, it will be imperative for South Australian farmers to concentrate on intensive rather than extensive agriculture. In this direction scientific agricultural research will play an important part, but will be done by agriculturists themselves by the adoption of practical and commonsense methods. As the greater part of the State is suitable for wheat and wool, and as these products have the most stable overseas market, it is quite right that these products should receive first consideration. To adopt a system of alternate cropping would, in most cases, necessitate burning the straw, but this would encourage drift and have a tendency to impoverish the land, so that it appears necessary to adhere to a system of rotation cropping. As land sown with cereals has a much greater grazing value than natural grass or herbage, I suggest as a general rule a system of rotation. Bare fallow, wheat, and cereals in the drier districts seem to offer the greatest value. Where there is any tendency to drift

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oats should be sown in the straw. If the land is not sufficiently clean it could be worked with a disc implement. Under this system portion of the oats can be grazed and the balance cut for hay or harvested. Take as an example a farm comprising 900 acres. On a three-year system the grazing period, January 1st to December 31st, would be—(1) 300 acres bare fallow, followed by wheat, grazing period nil. (2) 150 acres oats for crop, grazed January 1st to March 31st 150 acres for three months. (3) 300 acres bare fallow, grazed January 1st to July 30th 300 acres for seven months. (4) 150 acres oats for feed, grazed August 1st to December 31st 150 acres for five months. Thus one would have approximately the following acreage for grazing:—January 1st to March 31st, three months, 450 acres. April 1st to July 31st, four months, 300 acres. August 1st to December 31st, five months, 150 acres. Under this system half of the land will be sown for crop, 300 acres for wheat, and 150 acres for oats, and the other half fallow and grazing. Normal years 150 acres of oats will yield about 100 tons of hay and 150 or 200 bags of grain, and the other 150 acres used for pasture will graze many more stock than land left out for grass or herbage. It prevents the land from becoming crusted, and it can be fallowed with a light plough. It also keeps the land comparatively free from grass, which harbors the take-all fungus. Oats, generally speaking, should be marketed in the form of produce. Sheep are very necessary on the farm, and although wool is a low price, sheep will always be a profitable side line. It may not pay to hand feed extensively, unless to carry over short periods, when portion of the surplus oats may be put to profitable use. Cows are good, and offer the most profitable use for surplus oats, but it is very important that cows kept should come up to the required standard. Milk, butter, eggs, meat, and vegetables go far towards keeping the home, and will become a more important factor as intense culture becomes more general. Good fallow sown with cereals most adapted to the district and well-bred, well-fed stock offer the maximum returns from a given area." (Secretary, Mr. C. Deer, Cleve.)

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BUGLE.

September 9th.—Present: 10 members and three visitors.

HARVEST OPERATIONS.—The following paper was contributed by Mr. E. Smith:—"In order to assure smooth working and avoid vexatious delays during the busy harvesting period, it behoves the farmer to make a careful inspection of all machinery, &c., used in connection with same. The first machine in use will be the binder, and considering the rough usage it is subjected to, it is remarkable that troubles in this direction are not more numerous. It is put to work in rough and stumpy country, and as long as the fingers will, with a big heave of the tilting handle, clear the stumps, the platform suffers by having to carry the weight of the near side of the machine over the obstacle, which in a number of cases means a buckled platform, heavier running on account of the slats on the canvas bearing heavily on the dented platform, and the consequent wearing on the canvas itself. In most of our country one has to set the height of the platform to be sure of clearing the stumps, and this means that when cutting the machine is tilted more than it should be to assure perfect working, and the disadvantages are that the weight on the tilting handle is greater, and, further, that the hay will have a tendency to run up the canvas head first, resulting in bulky butts and uneven tying. In order to overcome this trouble I use, in a crop of average height, a hoop iron slat bolted to the near side framework of platform and laid across to the top of the canvas about 18in. from knife, the slat being long enough to bridge the space between the two canvases. This slat is a distinct advantage, in that it checks the speed with which the heads of the hay travel. In many instances, especially in the older type of machine, one is likely to experience trouble with the tying apparatus, the main factor being that the twine is not held securely while the knoter is completing its operation, and in most cases this is due to the fact that rubbish collects under the twine holder spring, or that the spring itself wants renewing. The annoying delay during hay carting of having to handle the untied sheaves can be overcome by a little more attention to the knoter, because after continued use the lip becomes too smooth to hold the twine when the knot is being made, and this can be overcome by tripping the machine until the knoter jaws are open and roughening the lip with a small file. In numerous instances one is compelled to cut a crop that contains short patches, and perhaps through lack of attention or otherwise the short hay is not in a compact sheaf sufficient to force

the trip, and consequently there is a compaction which prevents the operation of tying the sheaf; to avoid this the introduction of a wire from the bottom of the trip lever to the binder seat the operator, by pulling the same, can clear this obstruction. Care must be used, however, to see that this wire is placed so that it will not come in contact with the bottom ends of packer arms. *Strippers*.—Before taking these implements into the paddock I advise a thorough overhaul of all working parts, and especially see that the crown and pinion are meshing correctly. The renewals of these working parts are expensive, and can, to a great degree, be avoided if care is exercised. The pinion, when in gear, should be running level, and should there be undue wear on the outside of same, a thin leather washer should be inserted under the bearing nearest the pinion, and if the wear is on the inside of the pinion the washer should be placed under the bearing near the box of the stripper. There should be $\frac{1}{16}$ in. clearance between the tip of the teeth on the pinion and the bottom of the teeth on the crown wheel. In our district ordinary blacklead or graphite is ideal for use on the pinion, in that it does not hold the dirt to the degree that is apparent when using oil or grease. With the wider machines, having centre bearings, the set screws on the latter should not be forced tightly on to the bearing, but should have a fraction of clearance in order

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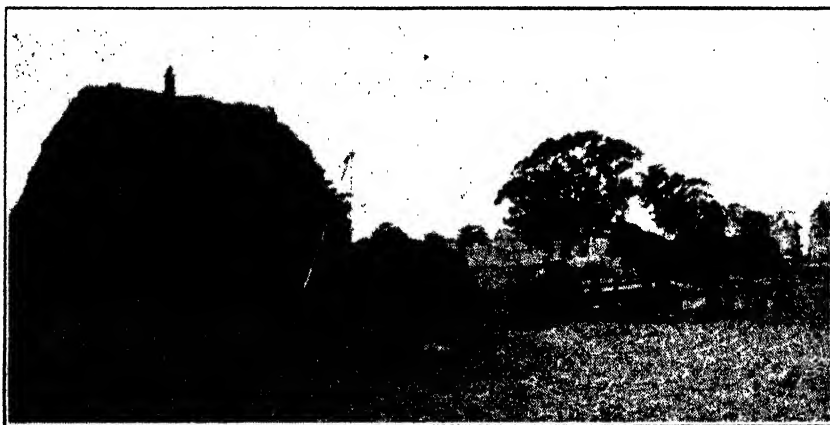
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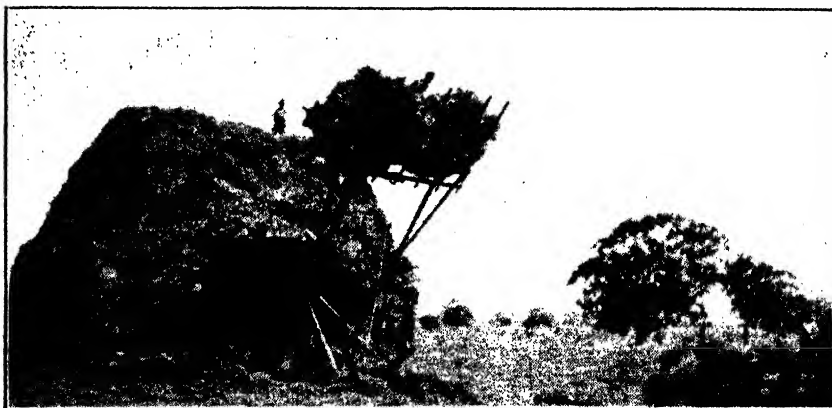
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that the beater spindle can run true without pressure to force it into alignment. The ordinary oiling arrangements, especially on the beaters, can be improved upon by the introduction of bottle feeders. These feeders need attention only twice a week, and the saving of time and oil is apparent. Care, however, must be used to see that the end of the small wire feeder in the bottle rests on the spindle, for it is the action of the revolving spindle on this wire that provides proper lubrication. In respect to the woodwork on all farm machinery, after a stiff brushing to remove dirt, &c., a generous coating of heated raw linseed oil is the best means of preserving same, and on the stripper and waggon wheels the surest way of overcoming the necessity for frequent retyring. When reading reports in the *Journal of Agriculture* one repeatedly comes across recommendations to use boiled oil on woodwork. I disagree with this for the reason that boiled oil creates a film over the grain of the wood and prevents the oil from penetrating. I strongly advise farmers to endeavor to market as good a sample of wheat as is possible. We in Australia are at a great disadvantage so far as world's parity is concerned, in that we have been satisfied to produce an F.A.Q. sample and overlook the important factor that we are selling against countries which market graded wheat. An instance of lax



Stacking clover hay on property of Mr. S. Shepherd, Kyhybolite. Push-rake delivering hay to the mechanical fork.



Stacking clover hay on property of Mr. S. Shepherd, Kyhybolite.—Mechanical fork, operated by one horse, delivering hay to stack 21ft. high by an "other throw" movement. Estimated capacity, 20 tons a day; three to four hands. Note—The man on the fork is having a free ride to the stack—no need for a ladder.

methods was painfully brought home to us recently, when we were compelled to purchase seed wheat at 5s. and over per bushel from other districts, and growers would have been ashamed to have been responsible for the marketing of some of the samples supplied as true to type seed wheat. The question of guarantees and bonuses, &c., would not be necessary if the quality of wheat sold overseas was such that the necessity for a margin on account of rubbish, &c., made by the buyer was obviated, and the sooner the method of marketing is improved upon the sooner will our Australian wheat be in greater demand and better prices obtained." (Secretary, Mr. B. Auricht, Taldra.)

RAMCO.

Meeting held August 4th. Present: Seven members. A report on the year's work was read by the Secretary (Mr. J. J. Odgers), who stated that although the membership was small, attendance at meetings had been good. Each meeting had either a paper or discussion, and it was pointed out that interest of members in providing subjects was one of the factors of the Branch's success.

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

Mr. H. Paech presided over an attendance of 10 members and visitors. Mr. A. Law read an article from the *Journal of Agriculture*, "Pig Raising where Lucerne can be Successfully Grown," and a keen discussion followed. (Secretary, Mr. E. Paech, Rockleigh.)

CHERRY GARDENS (Average annual rainfall, 35.03in.).

September 6th.—Present: 14 members.

The meeting took the form of a working bee, at the Soldiers' Memorial Park, in assisting in digging around the ornamental trees and shrubs. In the evening members met at the residence of Mr. H. Jacobs and reports of delegates to the Hills Conference were received and discussed. (Secretary, Mr. A. Stone.)

McLAREN FLAT.

Meeting held August 7th. Present: 25 members and seven visitors. Subject to the approval of the Dried Fruits Board members of the Branch decided to donate 1 ton of currants to organisations supplying meals to the needy in Adelaide. (Secretary, Mr. A. Bruce.)

September 11th.—Present: 21 members and three visitors.

AGRICULTURAL EDUCATION.—Mr. T. Williams read a paper on this subject. The speaker referred to the advantages to the producers of the various experimental farms, orchards, and farmers' plots, &c. Discussing the paper, members agreed that too much publicity could not be given to the valuable work that was being done at the Blackwood Experimental Orchard, and that an effort should be made to have the results of the various experiments printed. (Secretary, Mr. A. Brice.)

MOUNT COMPASS.

Meeting held September 4th. Present: 36 members and a number of visitors. Mr. A. Anderson gave an address, "Potato Growing." Mr. J. Black read articles dealing with the subjects, "The Australian Economic Outlook and "The Paterson Stabilisation Scheme." Mr. H. Peters drew attention to the prevalence of bloat in dairy cattle in the district, and advised members to provide for free access to dry fodder as a guard against the trouble. (Secretary, Mr. J. Black.)

MOUNT PLEASANT (Average annual rainfall, 27.38in.).

Meeting held September 12th. Present: Mr. Y. Tapscott (Chair) and seven members. Reports of the delegates who attended the Balhannah Conference were received and discussed. (Secretary, Mr. D. Stow-Smith.)

RAPID BAY.

Meeting held September 11th. Present: 14 members and two visitors. Mr. R. Hill (District Agricultural Instructor) delivered an address, "The Development of Pasture Lands." (Secretary, Mr. L. Morris, Delamere.)

SHOAL BAY.

Mr. H. T. Noske gave an interesting report of the proceedings of the Southern Conference held at Murray Bridge. (Secretary Mr. H. T. Bell, Wisanger, K.I.)

CROWN LANDS.

LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Adelaide.

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned :—
"First Aid to the Horse," by F. E. Place, B.V.Sc., M.R.C.V.S., &c. ; price, 3s. ; posted, 3s. 2d.
Journal of the Department of Agriculture, 5s. per annum in advance ; 1s. per single copy to residents in South Australia. Other places, 10s. per annum ; single copies, 2s. each.
 The bulletins and leaflets may be obtained by sending a 1d. stamp for postage.
 All communications must be addressed—Ed., "Journal of Agriculture," Box 901E, G.P.O., Adelaide.

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

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“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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S. R. WHITFORD,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

South-East, at Kalangadoo (Secretary, Mr. J. Dignan), March 18th.

Yorke Peninsula, at Maitland (Secretary, Mr. T. H. Howlett, Arthurton), April 15.

The above Conferences will commence at 10.30 a.m. in each case. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of—

“Agricultural Research in 1929.” (Price 1s. 6d.). Published by the Royal Agricultural Society of England.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. SPARFORD, Deputy Director of Agriculture.]

Solubility of Superphosphate.

I have noticed on working the soil after harvesting a cereal crop, and also when digging potatoes, small particles of superphosphate; have these particles of super lost their value, or is it still available for future plant life? (Blackheath Agricultural Bureau.) Reply—Superphosphate consists in the main of water-soluble phosphate of lime and gypsum in almost equal proportions, and the white particles found long after the superphosphate has been applied are largely composed of the gypsum. Most of the phosphate of lime, which is soluble in the soil moisture, is absorbed by the plants before they reach maturity.

Good Crops on Soil-eroded Paddocks.

Why did ground which had the top soil washed away produce a better crop on it than the ground one would consider good fallow with a good tilth? (Narriady Agricultural Bureau.) Reply—In certain seasons it is not so very unusual to find that where light soil has drifted off the surface, even down to the depth of ploughing, or where the soil has been washed away, better crops are received than from normal fallow. In our experience of this happening it has always occurred in those seasons when the distribution of the rainfall has been such that the cultivated land has not been properly packed together. We have seen several cases of it during this past season, and in every single instance the ordinary fallow, where the crop was not so good as on the washed or drifted area, had remained loose and open. Wheat plants demand compact soil, and in dry years it is more important to pack the fallow together at seeding time than in wetter years, because in the latter case sufficient winter rain falls to correct excessive looseness of the soil.

Can Stable Manure Replace Superphosphate?

“If stable manure be dried, sieved, and run through the seed drill, would it replace super, and, if so, what quantity would be required?” (Endunda Agricultural Bureau). Reply—Superphosphate is applied to crops to make up the shortage of phosphoric acid,

and for our conditions the only manures that can replace superphosphate are those containing an equal amount of this plant food and in a water-soluble form. One hundred-weight of superphosphate (45 per cent.) contains 23lbs. phosphoric acid, and ordinary stable manure only contains about 7lbs phosphoric acid to the ton, but when this latter material is properly air-dried, the content of phosphoric acid will probably be about 15lbs. per ton. If the comparison between superphosphate and stable manure ended there, it would be a simple matter to calculate how much to use to equal a given dressing of superphosphate, but the phosphoric acid in the stable manure is in an insoluble form, whereas in the superphosphate it is soluble in water.

Insoluble phosphates are not suitable for wheat crops in our conditions, and large quantities of added organic matter are not helpful for wheat, particularly where bare fallowing is practised, and so for these two reasons stable manure will not economically replace dressings of superphosphate in any district in South Australia.

Rye Grass for Natural Pastures..

“H. L.,” Inman Valley, asks “What is the best plan to adopt to establish rye grass for grazing on an unbroken pasture”? Reply—If it is desired to establish some green feed during the dry months, rye grass is hardly the plant for the purpose, because it is not green in February or March, except in damp locations or where irrigation is practised. A better grass for the purpose is *Phalaris tuberosa*, but the outstanding plant, where it can be grown, is lucerne, both of which require good soil preparation before seeding. Perennial rye grass will grow well in your conditions, but you would be very fortunate to get a good stand unless sown on cultivated land. Wimmera rye grass will do fairly well and can be established without much soil preparation, but it does not supply green feed in the summer. It is only an annual, but seeds itself with the same certainty as does barley grass. If your land is loose enough for the seed drill to make decent tracks in it, in March or early April you could drill in superphosphate and 8lbs. Wimmera rye grass and 2lbs. Poverty Bay or Hawke's Bay rye grass seed to the acre before the first autumn rain, then thoroughly harrow the land. To make more certain of success it is essential that the seed be put in before the ordinary pasture plants germinate, so that they all get a start together, for if you seed the land after the germination of the feed, the seedlings of the introduced plants cannot compete with those already up.

Flocculating Soil Agents.

“Does lime act mechanically on a stiff soil in a similar manner to a quantity of sand, or is there a chemical action therefrom which loosens stiff soil?” (Scott's Bottom Agricultural Bureau). Reply—Lime, gypsum, and a few other substances are known as “flocculating” agents when applied to soils, i.e., they lead to the creation of an artificial coarseness of texture by the flocculation of the soil particles. Their action is essentially a mechanical one, in that they cement some of the particles together. The stickiness and heaviness of clayey soils is due to the fact that they contain a relatively high proportion of extremely small, flaky particles. When some of these are stuck together, the stickiness is overcome.

If a clay soil is shaken up with water, the water will remain muddy for a very long time, even for years in some cases, after the heavier particles have settled to the bottom. This muddiness persists because some of the clay particles are so fine and flaky, and as a consequence possess little weight and a relatively large surface area, that they remain in suspension in the water. Now, if a little of one of the flocculating agents is added to the muddy water, the clay particles quickly settle to the bottom and the water becomes clear. This is brought about because some of the clay particles are cemented together to form larger particles with increased weight and reduced surface. In soils these substances bring about the same result.

HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. GEO. QUINN, Chief Horticultural Instructor.]

Black Aphis in Cherry Trees.

Commenting on specimens of diseased foliage of a cherry tree forwarded to the Department of Agriculture for identification, Mr. Geo. Quinn (Chief Horticultural Instructor) says from the external appearance of the foliage he is of the opinion that their curled and stunted condition had been produced by an attack of the black aphis of cherry (*Myzus cerasi*), which occurred probably in November or December. When the curled up folds were opened out, they enclosed myriads of moulted skins of aphides, which strengthens the above view as to the causal organism. At any rate, the general appearance is identical with terminal leaves on cherry trees to be found here and there in the Blackwood collection, where a slight and late attack of this pest was experienced this season. The precautionary measures lie in watching for the aphides on the tips of the young shoots in early summer, and if detected before they have been there long enough to cause the leaves to curl, a good drenching with Black Leaf 40 nicotine in soapy water applied as a spray will stop them, but success depends on prompt action.

DAIRYING INQUIRIES.

[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor.]

Concentrates for Dairy Cows.

Following a recent statement concerning the feeding of concentrates to dairy cows, Mr. H. B. Barlow (Chief Dairy Instructor) has informed a correspondent at Tailem Bend that the most suitable concentrates to feed are naturally those most easily and cheaply procurable, such as bran and crushed oats, and the addition of a little linseed meal would be advantageous. Mixing bran and oats in equal weights and feeding at the rate of 1lb. of the mixture to each 4lbs.-5lbs. of milk is very sound. Probably a mixture consisting of 100lbs. bran, 100lbs. crushed oats, and 25lbs. linseed oil would be more ideal and could be expected to give improved returns. Concentrates are usually better if fed with a little chaff in a dry state at milking time. The dry feed will tend to counteract the laxative effect of lucerne and is preferable and cheaper than pollard.

For fattening calves, feed as much skim milk as the calf will drink, provided it is not allowed to drink so much at one time that it shows signs of being badly "blown." After the first month, gradually increase the amount of linseed provided there is no indication of scouring. The main thing is to make any increase for alteration very gradually. If calves are tied up for about half an hour after feeding, they will not be so liable to suck each other; also, if they are given a box with chaff, crushed oats, and a little linseed to pick at, the effect will be good and also tend to eliminate the sucking. Once they have acquired the sucking habit it is hard to cure, but putting a little "bitter aloes" on the ears will check them considerably.

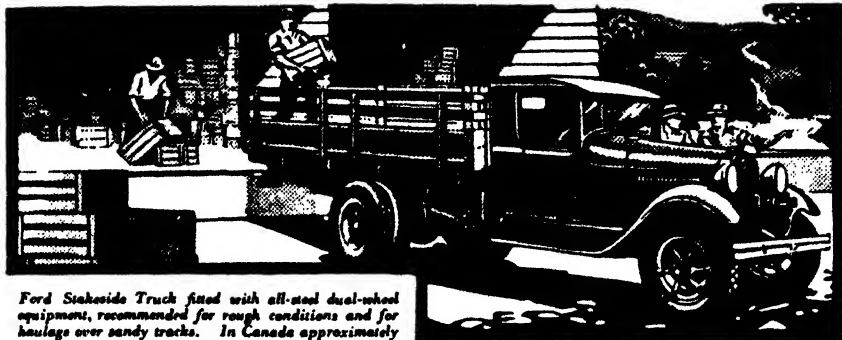
POULTRY INQUIRIES.

[Replies supplied by Mr. C. F. ANDERSON, Government Poultry Expert.]

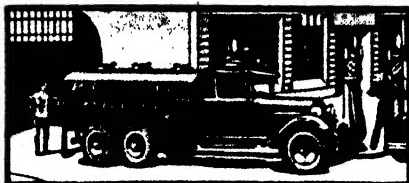
Roup.

H. G. Le G., Conmandook, reports chickens standing about, crops empty, but no attempt to eat, mouths open, and a white cheesy substance close to the top of the windpipe. Reply—The trouble with the poultry is roup, and when in the form as described in this

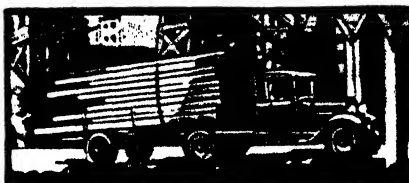
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case, it is very difficult to cure. The trouble is very infectious, and all affected birds should be isolated. The growth in the throat can be removed by sharpening a small piece of wood at one end and scraping the growth away, then apply powdered bluestone or iodine to the affected part. It seems evident that the trouble has started with a cold. Examine the nose of the birds for any discharge present. Make a weak solution of permanganate of potash and dip the head of the bird right in. Repeat daily.

Chick Disorders.

The Secretary of the Pinnaroo Women's Branch asks—*What is the cause and cure for a disease amongst chicks when they are about one month to six weeks old, the toes of the birds crumple up and the chicks are unable to straighten them out, they appear only to be able to shuffle along?* Reply—The trouble may be caused through the chickens perching too high from the ground, and, when jumping from the perch to the ground, both the feet and legs are injured, or it may be due to the chickens being confined in an area, the surface of which consists largely of limestone, &c., which is too rough for the delicate joints of the chickens to stand. Again, the trouble may have been present to a lesser extent from the time the chickens were hatched, on account of a lack of moisture in the incubator or under the hen; as these chickens were apparently hatched during December—a difficult hatching time, unless plenty of moisture is supplied.

Hens Eating their Eggs: Use of Rabbits for Food.

The Blackheath Branch of the Agricultural Bureau asks—*What is lacking in the food of poultry which causes the birds to eat their eggs, and how should rabbits be prepared for food for the birds?* Reply—The cause of egg eating may be due to the absence of greenfeed. I incline to the opinion, however, that there are probably one or two birds which first start the trouble. If a close watch is kept, and these can be detected and removed from the flock, the trouble ceases. Again, it may be due to insufficient nests, and the birds laying round the farm. Egg eating is not so prevalent where plenty of nests are available and sand or shell grit put in the nests. In feeding rabbits, the best method is to boil them.

Feeding Ducks.

The following questions were forwarded by the Marama Branch of the Agricultural Bureau:—(1) *Can hard wheat be fed safely to Muscovy ducklings two months old?* (2) *What feeding is recommended for these birds?* Replies—(1) Hard wheat is suitable for ducks and will not kill them. (2) More suitable feeding is a wet mash compound of one part bran, two parts pollard, 50 per cent. green feed, and 1lb. meat meal per 100 birds. If required, crushed wheat can be substituted for pollard, and boiled rabbits for the meat meal.

Roup in Turkeys.

The Wasleys Branch of the Agricultural Bureau asks “*What is a cure for turkeys with swollen heads.*” Reply—The trouble with the turkeys is roup. It is very infectious and difficult to treat. Isolate all affected birds. The swelling must be operated on by cutting across the swollen part and forcing out the contents of the swelling; paint the wound with iodine daily until healed. It may be found necessary to place the fingers inside the mouth of the bird so that all the matter can be forced out. This disease frequently starts in the nostrils, caused through the birds foraging, and when drinking various particles of dirt, &c., the nose becomes clogged and the bird is unable to breathe freely. It is always advisable to keep all dirt and foreign matter away from the nose. This can be done by periodically wiping the nose with a rag dipped in kerosine. A few drops of kerosine in the drinking water are also effective.

Diarrhoea.

"The Cause of and Cure for Diarrhoea in Poultry." (Lyndoch Conference). Reply—Diarrhoea can be attributed to several causes, among the most prominent of which are:—(1) Unsuitable food and water; (2) diarrhoea caused through poultry tick and round worms. Diarrhoea in the case of unsuitable food and water is generally of a whitish color and the birds are badly scoured. The cure in this case is the provision of proper food and water. The most prominent cases of diarrhoea, however, are caused either through poultry tick or round worms, the cause of which can usually be identified by the color of the droppings. In the case of the former, the color of the droppings is of a distinct green, the birds have a high temperature, and are usually very thirsty. The remedy in this instance is the eradication of the tick, especially in the perching area. The perches should be so constructed that they are kept away from the walls and back of the house, so that the tick are unable to reach the birds during the time they are on the perches. The perches should be easily removable so that they can be regularly treated with a 10 per cent. emulsion of kerosine and soapsuds, to which gear-box oil or any similar oil can be added; once a week is effective.

Diarrhoea due to round worms can be easily distinguished to that of poultry tick by the color of the droppings. Where round worms are responsible for the trouble, the droppings are of a distinct mustard color, the feathers appear ruffled, and the birds have usually a listless appearance. Onions fed at the rate of 7lbs. per 100 birds once a week are effective. Turpentine one part, olive oil four parts, at the rate of one tablespoonful of turpentine to each 20 birds and fed after the birds have been fasted for 12 hours, is also effective. Nema capsules, obtainable from any poultry requisites store, are also certain in action.

Table Poultry.

"The Best Way to Make the Raising of Table Poultry a Payable Proposition." (Lyndoch Conference). Reply—The selection of a suitable breed of fowl for the purpose. It must be kept in mind that the demand is for a bird that will dress at 4lbs. to 4½lbs. The Black Orpington, Buff Orpington, Rhode Island Red, Plymouth Rock, or Light Sussex will be found very suitable. The Black Orpington should claim preference; the hens lay a larger number of eggs than the other breeds and the cockerels are quicker growing. Black Orpington cockerels should be ready for marketing purposes at from 5 months to 5½ months, providing they have been properly fed. The time of hatching is also a deciding factor, for the reason that chickens hatched during certain periods do not make satisfactory growth. Hatching from early July to end of September is advised, and from early January to early March. The cockerels should be separated from the pullets as soon as the sexes can be determined. Birds for table purposes should be fed on two wet mashes a day, composed of two parts bran, two parts pollard, 30 per cent. green feed, mixed with skim milk. For the last three weeks, the birds should be confined in special fattening pens without runs. Where runs are attached, the birds are difficult to fatten owing to the exercise they get in the yards, and during these three weeks they should be given as much wet mash as they can eat. Where pollard is not available, crushed wheat can be substituted.

Feather Eating.

"A Cure for Feather-eating Fowls!" (Lyndoch Conference). Reply—Feather eating, if undetected at the start, is often difficult to cure. It is caused at times by a deficiency in feeding, but more often the trouble is a form of cannibalism. The trouble, if seen early, can be easily stopped. It is usually started by one or two birds, and if a close watch is kept on the birds, it will be noticed that a bird will peck a few feathers from one bird, will pass on, and peck a few more from another bird, and continue in this manner. The habit is quickly acquired by other birds, and in a short time becomes general throughout the flock. If the first few birds are noticed at the commencement of

the trouble and removed from the other birds, the trouble will usually be checked. If large numbers of birds are affected, the feeding of the birds four or five times a day attracts their attention from the feather-eating habit. The application of Stockholm tar to the pecked birds will often check the trouble, the offending birds not liking the taste of the tar will stop feather eating. Where only a few birds are kept, the paring of a little from the top beak, so that the bird cannot close the beak sufficient to hold the feather, will prevent the trouble. A frequent cause of feather picking is when birds are heavily infested with feather-eating lice, the lice causing irritation to the bird. Dusting the birds with insectibane will kill the lice.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"H. A. F.," Gawler, has been using various preparations in an endeavor to get cows in calf. Inquirer has two cows which, although repeatedly served over a considerable period, do not get in calf. Reply—I do not think that the medicaments you refer to will be effective in producing the desired results. It is doubtful if you will succeed in getting the older cow in calf again since she has "missed" for so long, but the following treatment for both cows is the only one that you can attempt and that is likely to give you results. Next time the cows come "in season," make a note of the dates, but do not allow them to be served. After the heat period has passed off, commence douching each cow every second day with a solution of Condyl's crystals (one flat teaspoonful in 1 gall. lukewarm water). Continue this treatment for a fortnight, then subsequently, till the cows next come into "season" again, douche every second day with a solution of common salt, one teaspoonful to each pint of warm water (use about 1 gall. of solution per douche). When the cows come in season again, douche out once with a solution of baking soda (not washing soda) one or two teaspoonfuls to each pint of warm water half an hour before service.

"R. K. W.," Yeelanna, reports cow with the skin peeling off her udder and nose. Reply—The information supplied in your query is very little, but it appears as if the udder came in contact with some irritating substance. The fact that the nose was scalded could be accounted for by the cow licking the irritated udder. Treatment would consist in washing the udder with warm water and soap and later swabbing several times daily with a solution of bicarbonate of soda. Subsequently, anoint with zinc oxide ointment or vaseline.

"C. L. B.," Karoonda, reports horse, eight years old, good worker, gradually lost condition until now is very thin and weak. Reply—Starve the horse for 18 hours (allow water) and at the end of that period give the following drench:—Raw linseed oil 1½ pints, turpentine, four tablespoonfuls. Subsequently give a teaspoonful of powdered nux vomica night and morning for 10 days; to give, mix with treacle and smear well back on the tongue. Feed horse on good quality chaff (damped) and add a good ration of bran and also some crushed oats (if available). When feeding horse, it is advisable to divide the daily feed into five small feeds, as better results are then obtained.

"R. E. H.," Koonunga, has horse, 13 years old, walks on her toe, and when standing rests with the hoof turned back so that the crown of the hoof touches the ground, and the animal has been like this for nine months. Reply—The condition cannot satisfactorily be diagnosed without an examination, but it appears to be either (1) a paralysis of one of the nerves (popliteal), (2) a contracted back tendon. As the condition is an

old-standing one I cannot suggest any treatment which would be successful. However, horses which are "knuckled," if worked slowly and on soft ground, may be made useful for a long time by applying a long-toed shoe, though this will not cure or even improve the original disease. It would be advisable to get a blacksmith to make the shoe.

"W. A. M.," Meribah, reports two pigs, 18 months old, off food, sow has lost use of back legs. Reply—The trouble was apparently in the first place constipation, and a purgative dose of 3ozs. to 4ozs. of Epsom salts in slop feed would soon correct that. The continued weakness trouble in the sow will be due to the strain of pregnancy and indicates some mineral deficiency in the diet. The animals, especially the sow, should each be given ½oz. sweet ground bone meal in the feed daily. In addition, the sow could with advantage be given one teaspoonful of cod liver oil night and morning. Chopped green feed given in limited quantities daily would, if available, also be very helpful.

"T. H. E.," Allandale East, asks do calves become infested with stomach worms and can they be drenched safely with bluestone? Reply—Cattle do become infested with stomach worms (*Haemonchus contortus*), but do not suffer so severely from these parasites as do sheep. The bluestone solution as prepared for treating sheep, may be used in doses ranging from 3½ fluid ozs. for calves to 10½ fluid ozs. for adult cattle.

"A. P. B.," Goondooloo, reports three horses rapidly losing condition, and one of the animals has a severe cough. Reply—The following treatment is suggested:—(1) Starve for 18 hours (allow water only). (2) At the end of that time give the following drench:—Raw linseed oil, 1½ pints; turpentine, four tablespoonfuls. When giving the drench, shake up thoroughly and give slowly by the mouth. (3) Subsequently give a tablespoonful of Fowler's solution of arsenic night and morning for 12 days. This is the amount for one horse. To give, mix in a small damp feed. Give the horses the best feed available. If possible, crushed oats, and if any green feed, e.g., lucerne, is obtainable, get it for them. Horses rarely get tuberculosis.

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## THE RELATIVE BACON PRODUCING QUALITIES OF PIGS OF VARIOUS BREEDING.

[By W. R. BIRKS, B.Sc. (Agric.), Principal Roseworthy Agricultural College, and  
R. BAKER, R.D.A., Dairy Superintendent.]

### GENERAL REQUIREMENTS.

The lack of uniformity in type of pigs usually seen in our sale yards indicates a condition which will necessarily militate against the successful expansion of the pig-raising industry, especially if an extensive export trade is to be developed. The bacon curer is usually quite definite in his requirements as to type, and his ideas of a suitable carcass may be described briefly as one having the maximum length of side and depth of flank, a uniform and narrow layer of fat right along the back, ample development in thickness of flank, as even a distribution of lean amongst the fat as possible, fineness in the shoulder, a well-developed ham extending almost down to the hock, and a general firmness of carcass and fineness of bone. The careful breeder also, can very closely approach this ideal of bacon type, and to do this under South Australian conditions



View of Sties—Roseworthy Agricultural College.

it is generally considered necessary to cross one of the large, long, narrow, and flat-sided breeds, namely, the Large White Yorkshire or Tamworth, with one of the stocky, quick-maturing types, Berkshire or Middle York.

The objects of the tests, which are described in this report, were, firstly, to draw public attention to the type of pig required by the trade and to determine which of the various types under test most nearly met those requirements; and also to test these types with respect to relative speed and economy of fattening by determining the length of time and the quantity of foodstuffs required in each case for development from weaner weights (say, 40lbs. to 60lbs.) to bacon weights (say, 160lbs. live weight).

The experiment was arranged and carried out at the suggestion and with the co-operation of, members of the Pig Breeders' Society and the Bacon Curers' Association.

For the purpose of the test weaner pigs were supplied by the following gentlemen:—Messrs. W. J. Aldridge, Gawler River; Urlwin and Bosisto, Gawler; E. A. Wilcox,



Gawler; S. J. Giles, Gawler; and Messrs. W. Jacobs Ltd., and Foggitt, Jones Pty. Ltd. undertook to do the slaughtering under proper supervision and also to cure the carcasses, and thus follow up the test to the bacon stage.

With the addition of weaners drawn from the College piggery, it was found possible to include in the test pigs of the following breeding:—Large White Yorkshire, Large White Yorkshire x Berkshire, Large White Yorkshire x Middle York, Large White Yorkshire x Gloucester Old Spot, Tamworth x Berkshire and Berkshire.



Large White York x Berkshire.

Unfortunately, only a pair of specimens of each type were available in some cases and the test pens were all limited in number, therefore, to two. Of these, moreover, in the case of the Large White Yorkshire x Gloucester Old Spot, one died from heat



Large White York.

apoplexy early in the test. It is recognised that from results obtained with such a limited number of animals there are possibilities of errors, which, in the circumstances, can be corrected only by repetition of the test later on as further specimens of the types in question become available.

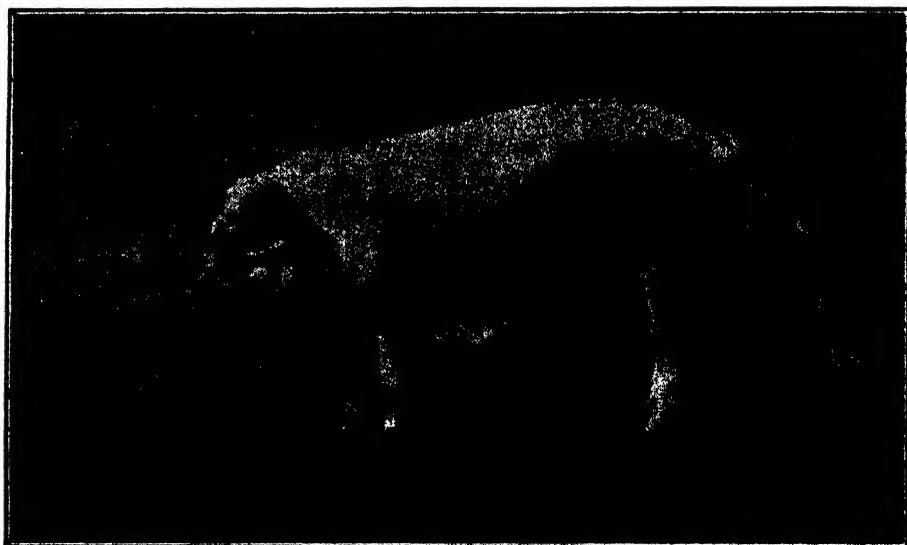


Although the test was one of the relative fattening propensities of different types, relatively small differences only were ultimately recorded in this respect. Moreover, special care was devoted to the preparation of the foodstuffs, and the method of feeding, and before proceeding to the consideration of the comparative results of the test it is proposed to discuss the feeding and the average rate and economy of fattening of all the pigs under test.

#### *The Ration.*

The ration was determined upon largely as a result of previous tests, which appeared to indicate broadly the following requirements:—(1) An ample supply of food, practically as much as the pigs will take. (2) A high percentage of nitrogenous foodstuffs (that is, peas, meat meal, or milk) to provide a properly balanced ration. (3) An assured supply of vitamins, such as can be obtained by feeding green lucerne, meat meal, or milk. (4) An ample supply of mixed mineral compounds.

Pigs had also, under conditions of free choice feeding, shown a marked preference for wheat. Ultimately, therefore, the basal grain ration determined upon was made up thus:—Wheat, five parts; barley, two parts; peas, one part. For the morning feed the above mixture was fed along with skim milk at the rate of 4lbs. per pig in a



**Large White York x Gloucester Old Spot.**

separate receptacle. In the evening the same grain mixture was used with the addition of half part meat meal. The grains were all crushed, mixed with meat meal and mineral mixture, and the whole fed dry. The mineral complex was added at the rate of 1 per cent. of the grain mixture, and the ingredients were—Ground rock phosphate, 40 per cent.; salt, 20 per cent.; charcoal, 20 per cent.; Epsom salts, 5 per cent.; sulphate of iron, 5 per cent.; sulphur, 5 per cent.; bicarbonate of soda, 5 per cent. An ample supply of drinking water was provided at all times. The dry feed was supplied to each pen in quantities to suit the appetites of each type of pig. As far as possible all pigs were given as much as they would consume, and an accurate record was kept showing the daily consumption in each pen. Lucerne was supplied at the rate of 1½lbs. (green) per pig per day, and it was noticeable that the pigs almost always left their dry feed for the lucerne as soon as the latter was put in the sty.



An analysis of the actual constituents of the ration was made, with the results shown below:—

TABLE I.—*Showing Results of Analyses of Foodstuffs.*

|                 | Dry Matter. | Carbo-hydrates. | Fats. | Proteins. |
|-----------------|-------------|-----------------|-------|-----------|
| Wheat .....     | 91.7        | 70.4            | 1.3   | 16.2      |
| Barley .....    | 92.0        | 71.3            | 1.6   | 13.9      |
| Pease .....     | 92.7        | 57.1            | 1.5   | 26.9      |
| Meat Meal ..... | 95.1        | —               | 12.8  | 47.4      |
| Skim Milk ..... | 9.6         | 5.1             | .1    | 3.5       |
| Lucerne .....   | 26.1        | 11.7            | .9    | 4.6       |

In the proportion in which these constituents were fed the mean value of the nutritive ratio is 1 : 4, i.e., one part of protein to every four parts of carbo-hydrates, plus the equivalent starch value of the fats. This is a ration slightly richer in the nitrogenous protein material than is generally recommended, especially in the later stages. Thus, Wolff gives rations of the following nutritive ratios for the purposes stated, in "Feeding Standards":—

| Age.                 | Weight. | Total Dry Matter. | Digestible Nutrients. |                       |                  |
|----------------------|---------|-------------------|-----------------------|-----------------------|------------------|
|                      |         |                   | Protein.              | Carbo-hydrates & Fat. | Nutritive Ratio. |
|                      | lbs.    | lbs.              | lbs.                  | lbs.                  | lbs.             |
| 2 to 3 months .....  | 50      | 2.1               | 0.38                  | 1.50                  | 1 : 4            |
| 3 to 5 months .....  | 100     | 3.4               | 0.50                  | 2.50                  | 1 : 5            |
| 5 to 6 months .....  | 124     | 3.9               | 0.54                  | 2.96                  | 1 : 5.5          |
| 6 to 8 months .....  | 170     | 4.6               | 0.58                  | 3.47                  | 1 : 6            |
| 8 to 12 months ..... | 250     | 5.2               | 0.62                  | 4.05                  | 1 : 6.5          |

That the ration as fed in this test accurately met the requirements of the young growing pigs is indicated by the relatively small amount of foodstuff required to produce increase in live weight. Whereas it is usual to regard 4lbs. of dry foodstuff as essential for the production of 1lb. increase in the weight of a pig, in this test the mean results show that 3.36lbs. only suffice. This relation between the quantity of food consumed and increase in live weight is naturally a most important factor in the question of the cost of production.

In calculating the cost of the ration fed the following scale of prices has been adopted as representing approximately current rates:—

TABLE II.—*Schedule of Values of Foodstuff.*

|                       |                                               |
|-----------------------|-----------------------------------------------|
| Wheat .....           | 2s. per bushel = 40d. per lb.                 |
| Barley .....          | 1s. 6d. per bushel = 36d. per lb.             |
| Pease .....           | 3s. per bushel = 60d. per lb.                 |
| Meat Meal .....       | 17s. per cwt. = 1.82d. per lb.                |
| Skim Milk .....       | 2d. per gallon = 2.00d. per lb. (dry matter). |
| Lucerne .....         | 30s. per ton = 536d. per lb. (dry matter).    |
| Mineral Complex ..... | 8s. 5d. per 100 lbs. = 1.01d. per lb.         |



*Increase in Weight.*

The mean rate of consumption of dry matter in the whole ration per pig per day was 5.84lbs., and the mean cost of feeding 3.358d. per day. But the mean rate of increase in weight was 1.741lbs., so that the mean cost per pound of increase in live weight was 1.929d. The usual loss of weight in killing and dressing is 30 per cent., and this figure was closely approximated in the actual killing results in these tests. The mean cost of foodstuff per pound of pork, therefore, was 2.75d.

The pigs entered the test with a mean live weight of 55.91lbs. In eight weeks all but four had reached bacon weight (160lbs.), and these four were ready in 10 weeks from the commencement.

The mean results of the test may now be indicated in the form of a table.

TABLE III.—*Showing the Average Results from 11 Pigs, all Similarly Fed.*

|                                                               |             |
|---------------------------------------------------------------|-------------|
| Mean age at the commencement of test.....                     | 87.27 days  |
| Mean age at completion of test .....                          | 150.36 days |
| Mean weight at commencement of test .....                     | 55.91lbs.   |
| Mean weight at conclusion of test.....                        | 165.73lbs.  |
| Mean daily increase in live weight .....                      | 1.741lbs.   |
| Mean daily consumption of foodstuffs (dry matter).....        | 5.84lbs.    |
| Mean consumption of foodstuffs per lb. increase (live weight) | 3.36lbs.    |
| Mean cost of foodstuffs per lb. increase (live weight) .....  | 1.929d.     |
| Mean value per pound of dressed weight .....                  | 4.95d.      |
| Mean corresponding value per pound of live weight .....       | 3.46d.      |

The difference between the cost of foodstuffs and the value per pound live weight, namely, 1.53d., has, of course, to cover all other working and overhead expenses. It is difficult to estimate, even roughly, what these might be in any set of circumstances, but the figures appear to indicate that there is an ample margin and a satisfactory prospect in economic pig fattening so long as present relative prices are maintained.

*Relative Results.*

Turning now to the relative results from the different pens, the rates of increase in live weight and consumption of food, and the cost per pound increase, are shown in the next table. The figures in this and subsequent tables represent the mean results from two pigs in each pen, except in the case of the Large White Yorkshire x Gloucester Old Spot, in which a single result only was available.

TABLE IV.—*Showing Relative Rates of Fattening and the Cost per Pound of Increase in Live Weight of Pigs of Various Breeding.*

|                                        | Days in Test. | Initial Weight. | Final Weight. | Daily Increase. | Daily Food Consumption. | Food Consumed per lb. of Increase. | Cost of Foodstuff per lb. of Increase. |
|----------------------------------------|---------------|-----------------|---------------|-----------------|-------------------------|------------------------------------|----------------------------------------|
|                                        | Lbs.          | Lbs.            | Lbs.          | Lbs.            | Lbs.                    | Lbs.                               | Pence.                                 |
| Large White York .....                 | 58            | 63              | 163           | 1.707           | 6.04                    | 3.54                               | 2.02                                   |
| Large White York x Berkshire           | 58            | 54              | 165.5         | 1.922           | 6.10                    | 3.18                               | 1.80                                   |
| Large White York x Middle York         | 58            | 76.5            | 175           | 1.698           | 6.09                    | 3.59                               | 2.01                                   |
| Large White York x Gloucester Old Spot | 58            | 47              | 169           | 2.103           | 5.77                    | 2.74                               | 1.58                                   |
| Tamworth x Berkshire ....              | 72            | 46              | 160           | 1.583           | 5.54                    | 3.49                               | 2.03                                   |
| Berkshire .....                        | 72            | 44.5            | 164.5         | 1.666           | 5.60                    | 3.36                               | 1.95                                   |
| Means .....                            | —             | 55.91           | 165.73        | 1.741           | 5.84                    | 3.36                               | 1.929                                  |



As pointed out, owing to the limited number of animals employed in each case, the figures quoted in the tables can only be corrected by a repetition of the test on a larger scale; still, from the material available, it is possible to make the following comments:—On examination of the figures tabulated in Table IV., the Large White York. x Gloucester Old Spot, under the conditions of feeding and management employed, has shown a distinct tendency to lay on increase rapidly for a minimum of food consumed; in fact, 19 weeks from birth the pig reached bacon weight. On the other hand, though of the required weight, the food consumed appears to have been utilised for body increase, without showing the plumpness of a well-fed animal.

The Large White Yorks, on an average, were 22½ weeks before reaching maturity, they did not show the same economic use of food as the Large White York. x Gloucester Old Spot; still, they provided an even, well-filled carcass which more nearly approached the ideal animal.

The Large White York. x Berkshires quickly adapted themselves to sty feeding, and during the earlier weeks of the test rapidly increased in weight, in fact, at the end of five weeks they were showing a daily gain of over 2lbs. During the remainder of the test, in spite of an increased quantity of food, the rate of increase fell away.



Large White York x Middle York.

At bacon weight they presented a well rounded carcass, which had the appearance of being a little over fat. The age of this cross, at maturity, was 21 weeks.

The Large White York. x Middle Yorks provided the heaviest weights at the commencement of the test, but this did not appear to be an advantage, for the rate of fattening diminished as the test advanced. The two animals in this case were of opposite sex, and it was observed that the greater daily gain was recorded by the male, due mainly to the fact that the female lost ground when in season. Age at maturity was 21 weeks.

As referred to earlier in this report, it was necessary in the case of the Berkshires and Tamworth x Berkshires to prolong the fattening period by a fortnight in order to reach the required weights. It should be recorded that in all cases where Berkshire and Middle York. provided the whole, or part of the breeding the greatest daily gains were noticed during the earlier weeks of the test, and that towards maturity the rate of increase was reduced.

With regard to the comparatively low daily increase of the Tamworth x Berkshires this may be attributed to one of the animals meeting with an accident during the final week, reducing the daily gain for that period to .6lbs. With both the Berkshires and the Tamworth x Berkshires bacon weights were reached in 22 weeks.

The pigs were slaughtered under careful supervision, and the next tables show details of loss in weight in the process and the relative values of the carcasses. The grading was done by the factory experts, and the values shown were the actual prices paid by the factory as in the ordinary course of business.



TABLE V.—*Showing Relative Losses, in Slaughtering and Relative Values of Carcasses.*

|                                              | Farm Weight. | Factory Weight. | Loss in Transit. | Dressed Weight. | Cold Weight. | Loss in Slaughtering. | Total Loss. | Grading Order. | Price per Lb. |
|----------------------------------------------|--------------|-----------------|------------------|-----------------|--------------|-----------------------|-------------|----------------|---------------|
|                                              | Lbs.         | Lbs.            | Per cent.        | Lbs.            | Lbs.         | Per cent.             | Per cent.   |                | Pence.        |
| Large White Yorkshire .....                  | 162          | 149.5           | 7.71             | 114             | 111          | 25.73                 | 31.48       | 4              | 5             |
| Large White York x Berkshire .....           | 165.5        | 152.5           | 7.85             | 116             | 113          | 25.90                 | 31.72       | 5              | 5             |
| Large White York x Middle York .....         | 175          | 162.5           | 7.14             | 126             | 123.5        | 24.00                 | 29.43       | 2              | 5             |
| Large White York x Gloucester Old Spot ..... | 169          | 155             | 8.28             | 116             | 115          | 25.81                 | 32.54       | 6              | 4½            |
| Tamworth x Berkshire .....                   | 160          | 149.5           | 6.50             | 121.5           | 117          | 21.74                 | 26.88       | 1              | 5             |
| Berkshire .....                              | 164.5        | 152             | 7.60             | 122             | 118          | 22.36                 | 28.27       | 3              | 5             |
| Mean .....                                   | 165.73       | 153.36          | 7.46             | 119.54          | 116.36       | 24.13                 | 29.79       | —              | 4.95          |

It should be pointed out that both consignments of pigs encountered very hot weather and hence lost more weight in transit to factory than they might otherwise have done. On the other hand, the heat necessitated starving the pigs for 22 hours before forwarding, which would tend to give a low "farm" weight. The mean total percentage of loss was therefore probably normal.



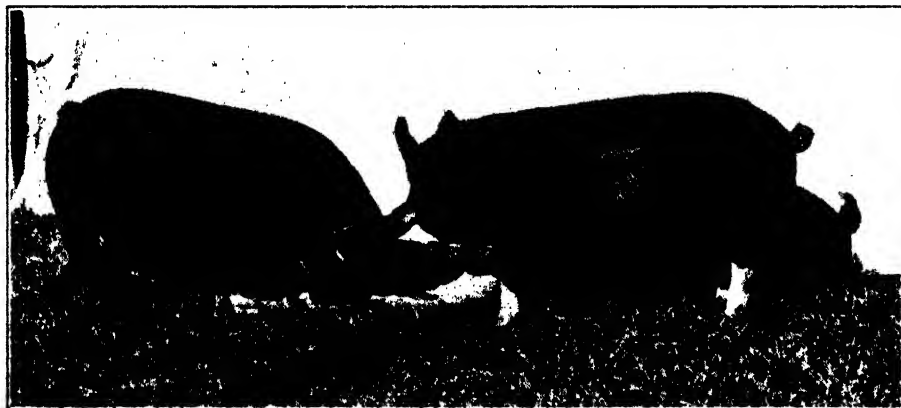
*Financial Aspect.*

Results on the financial side can probably be better stated in a table showing results per carcass, thus:—

TABLE VI.—*Showing Financial Returns per Pig.*

|                                           | Increase in<br>Liveweight. | Value of<br>Increase. | Cost of<br>Food<br>Consumed. | Net Value<br>Increase of<br>per Pig<br>Over Cost<br>of Food. |
|-------------------------------------------|----------------------------|-----------------------|------------------------------|--------------------------------------------------------------|
|                                           | Lbs.                       |                       |                              |                                                              |
| Large White York .....                    | 99                         | 28/10-155             | 16/7-984                     | 12/2-170                                                     |
| Large White York x Berkshire .....        | 111-5                      | 32/5-860              | 16/9-604                     | 15/8-256                                                     |
| Large White York x Middle York ...        | 98-5                       | 28/8-405              | 16/9-141                     | 11/11-254                                                    |
| Large White York x Gloucester Old<br>Spot | 122                        | 31/11-913             | 16/0-287                     | 15/11-629                                                    |
| Tamworth x Berkshire .....                | 114                        | 33/2-600              | 19/3-997                     | 13/10-603                                                    |
| Berkshire .....                           | 120                        | 34/11-584             | 19/6-320                     | 15/5-264                                                     |
| Mean.....                                 | 109-82                     | 31/8-102              | 17/7-852                     | 14/0-250                                                     |

The "value of increase," with one exception, is based on 5d. per pound dressed weight; in the case of the Large White York. x Gloucester Old Spot it was estimated at 4½d. per pound. Although there is an existing prejudice against the carcass of the Large White York. x Gloucester Old Spot as ideal from a bacon point of view, results in this test have shown that, owing to its ability to lay on increase economically, it



Berkshire.

has returned the greatest financial gains when bought over the scales at the price mentioned. On the other hand, when pigs of this type are offered for sale in the open market they generally sell at a greatly reduced value.

The following report on the condition of the carcasses, from a bacon point of view, was prepared by Messrs. S. Monks, representing Foggitt, Jones Pty. Ltd., and W. Jacobs, of the firm of W. Jacobs Ltd.



First consignment, consisting of two Large White Yorkshires, two Large White York. x Berkshires, two Large White York. x Mid. Yorks., and one Large White York. x Gloucester Old Spot.

1. Six out of the seven pigs under observation were described as conforming to the general trade requirements, i.e., first grade, while the Large White York. x Gloucester Old Spot did not possess the same well-defined characteristics, and was classed as second grade.

2. After scalding, each pig showed a somewhat red coloration on the skin, though not actually sunburn, was, in all probability, due to the excessive heat experienced during transit.

3. *Criticism of Carcass:--*

Large White York. x Mid. York (First Choice).—Sides: Of good length, lean, with light, even thickness of fat along the back. Middles: Well shaped, ribs well turned forming a good flank of even thickness. Hams: Fairly uniform in shape, though lacking fullness immediately above the hock. Shoulders: Well shaped and not too heavy. Bone: Light. Quality of flesh: Good appearance, soft texture in the flesh, fat and lean well balanced.

Large White York (Second Choice).—Sides: Of good length, well formed. Middles: Good, average thickness of fat along the back, well-turned ribs showing an even belly and flank. Hams: Long and light, rather tapering to the hocks. Shoulders: A tendency to over production of fat along the top. Bone: Fine. Quality of flesh: Soft in texture, with a slight predominance of fat throughout the meat.



Tamworth x Berkshire.

Large White York. x Berkshire (Third Choice).—Sides: Of good length, well formed. Middles: Well shaped, but showing an excess of fat along the back, ribs well sprung with good flanks. Hams: Well formed with desired plumpness, but showing a little too much fat. Shoulders: Heavy layer of fat along the top where not required. Bone: Fine. Quality of flesh: Of excellent texture, but showing too much fat throughout in comparison to lean.

Large White York. x Gloucester Old Spot (Fourth Choice).—Sides: Of good length, lacking uniformity. Middles: Lean, with moderate thickness of fat along the back, belly and flanks not well developed, losing weight where most desired. Hams: Lack plumpness, tapering sharply. Shoulders: Lean, but too heavy in the bone. Bone: Heavy, showing a thick hock. Quality of flesh: Below average in texture with coarse fibre, meat lean throughout.

Second consignment, consisting of two Tamworth x Berkshire and two Berkshires.

1. The four pigs of this consignment were classed as ideal from the trade point of view, and if curers could regularly obtain this class of article there would be no complaint. It should be pointed out, though ideal at the time of slaughtering, these pigs would quickly deteriorate if held at the farm for any further length of time.



2. After scalding the perfect condition of the skin of the Tamworth x Berkshire was most noticeable, whilst that of the Berkshire was little inferior. No evidence of the excessive heat was discernible, as in the case of the white pigs.

3. *Criticism of Carcass:*—

Tamworth x Berkshire (Extra Choice).—Sides: Of good length, lean, with perfect condition of fat along the back. Middles: Well shaped, ribs well sprung, forming an excellent flank. Hams: Well formed, plump, full at the hocks. Shoulders: Well shaped, with ideal proportions of fat to lean. Bone: Fine. Quality of meat: Good appearance, excellent texture, fat and lean well balanced.

Berkshire (Choice).—Sides: Of good length, with a uniform average thickness of fat along the back. Middles: Well shaped, showing even belly and flank. Hams: Well formed, plump, full at the hocks. Shoulders: Well formed, a trifle heavy at the top. Bone: Fine. Quality of flesh: Good appearance, fine texture, fat evenly distributed.

TABLE VII.—*Showing the Relative Losses Occurring in the Preparation of a Dressed Carcass for Curing.*

|                                        | Flare. | Head. | Backbone. | Feet. | Total. |
|----------------------------------------|--------|-------|-----------|-------|--------|
|                                        | Lbs.   | Lbs.  | Lbs.      | Lbs.  | Lbs.   |
| Large White York .....                 | 3-00   | 7-25  | 3-50      | 2-37  | 16-12  |
| Large White York x Berkshire ....      | 3-00   | 6-75  | 3-25      | 2-00  | 15-00  |
| Large White York x Middle York .       | 3-00   | 8-00  | 3-37      | 2-25  | 16-62  |
| Large White York x Gloucester Old Spot | 3-00   | 8-50  | 4-00      | 2-75  | 18-25  |
| Tamworth x Berkshire.....              | 4-00   | 8-50  | 2-50      | 1-75  | 16-75  |
| Berkshire .....                        | 3-50   | 8-00  | 2-50      | 1-75  | 15-75  |

Unfortunately, the weight of the flesh trimmed from the sides was not available, therefore it is not possible to estimate the total percentage of loss in the preparation for curing.

Indebtedness is acknowledged to Messrs. W. Jacobs Ltd. and Foggitt, Jones Pty., Ltd., especially Messrs. W. Jacobs and S. Monks, for the interest evinced in these experiments and for the valuable assistance given on all occasions in connection with the slaughtering of the pigs and the collection of useful data.

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## ROSEWORTHY AGRICULTURAL COLLEGE.

## HARVEST REPORT, 1930-31.

[By W. R. BIRKS, B.Sc. (Agric.), Principal; T. A. COLE, D.D.A., Experimentalist; and L. W. BEAUMONT, R.D.A., Farm Superintendent.]

(Continued from page 758.)

## OATEN HARVEST.

Of the 400 odd acres of oats sown, 70 acres, in Crouch's A, was on fallow land, part of which had carried Sudan Grass in the previous summer. The yields there, but for the November gales, would have been excellent; as it was the Palestine, taken off beforehand, gave 12 bags per acre. Of the oats sown on stubble land about one-half (in Georges and Crouch's C.) partially failed and made indifferent ensilage and hay. The balance, including Nottle's A., Flett's C., and Daly's C. (the latter sown originally for greenfeed), gave a mean yield of under five bags per acre. Seeding had been at the average rate of 60bs. of seed and 1cwt. of superphosphate (45 per cent.) per acre.

The general results of the oaten harvest are shown in the next table, and the comparison with mean yields of previous seasons in the next.

TABLE XI.—Summarising the 1930 Oat Returns.

| Field.                   | Variety.          | Area.   | Total Yield. | Yield per Acre. |
|--------------------------|-------------------|---------|--------------|-----------------|
|                          |                   | Acres.  | Bush. lbs.   | Bush. lbs.      |
| Crouch's A .....         | Palestine .....   | 16.644  | 600 0        | 36 2            |
|                          | Sunrise .....     | 21.625  | 413 30       | 19 5            |
|                          | Lachlan .....     | 17.053  | 285 0        | 16 28           |
| Nottle's A .....         | Early Burt .....  | 33.688  | 484 0        | 14 15           |
|                          | Early Kherson ..  | 17.876  | 309 20       | 17 13           |
| Flett's C .....          | Early Burt .....  | 58.037  | 832 10       | 14 13           |
| Daly's C .....           | Mixed (feed) .... | 46.538  | 613 0        | 13 7            |
| Experimental Plots ..... | —                 | 14.234  | 219 25       | 15 17           |
| Totals .....             |                   | 225.695 | 3,757 5      | 16 26           |

TABLE XII.—Showing the Average Oat Yield for the Period 1921-30.

| Season.                 | Rainfall. |        | Area.  | Yield per Acre. |
|-------------------------|-----------|--------|--------|-----------------|
|                         | "Useful." | Total. |        |                 |
|                         | In.       | In.    | Acres. | Bush. lbs.      |
| 1921 .....              | 12.98     | 17.16  | 55.4   | 25 22           |
| 1922 .....              | 14.90     | 20.00  | 79.3   | 28 29           |
| 1923 .....              | 25.30     | 27.41  | 106.7  | 30 22           |
| 1924 .....              | 16.08     | 20.43  | 98.3   | 23 30           |
| 1925 .....              | 14.18     | 15.65  | 83.8   | 34 16           |
| 1926 .....              | 16.63     | 18.49  | 93.7   | 22 11           |
| 1927 .....              | 11.73     | 14.59  | 70.6   | 12 35           |
| 1928 .....              | 11.85     | 18.03  | 76.7   | 23 9            |
| 1929 .....              | 9.73      | 13.06  | 277.1  | 14 5            |
| 1930 .....              | 11.77     | 12.85  | 225.6  | 16 26           |
| Mean for 24 years ..... | —         | —      | —      | 22 2            |



The oat variety test plots were in a triplicate series similar to the wheat test plots. These were harvested during the rough weather in November, and certain anomalies in relative yields consequently crept in. Thus some varieties susceptible to wind damage, such as Sunrise, Kelsalls, and Lachlan, suffered severely, while later varieties, such as Algerian, though possibly carrying a lighter crop originally, were able to hold the grain better, owing to their tougher condition at the time of the storms.

The plot yields of the 16 varieties grown this season, together with all the recorded yields of these varieties back to 1925 are shown in the next table, along with their mean returns.

TABLE XIII.—*Showing Grain Yields of Varieties of Oats, 1925-30.*

| Variety.               | 1925. |    | 1926. |    | 1927. |    | 1928. |    | 1929. |    | 1930. |    | Means. |    |
|------------------------|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|--------|----|
|                        | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.     | L. |
| Early Burt .....       | 40    | 11 | 34    | 16 | 26    | 1  | 47    | 3  | 29    | 39 | 26    | 4  | 33     | 12 |
| Scotch Grey .....      | 34    | 1  | 30    | 35 | 22    | 13 | 28    | 32 | 24    | 28 | 28    | 3  | 28     | 5  |
| Sunrise .....          | 34    | 14 | 13    | 18 | 27    | 22 | 52    | 0  | 18    | 24 | 16    | 12 | 27     | 3  |
| Guyra .....            | 29    | 18 | 13    | 21 | —     | —  | 30    | 37 | 27    | 30 | 29    | 37 | 26     | 13 |
| Smyrna .....           | 30    | 5  | 12    | 31 | —     | —  | 31    | 29 | 22    | 37 | 33    | 17 | 26     | 8  |
| Kelsalls .....         | 48    | 26 | 15    | 30 | 30    | 19 | 29    | 22 | 19    | 9  | 6     | 12 | 25     | 0  |
| Kherson .....          | 43    | 29 | 19    | 2  | 9     | 5  | 25    | 17 | 23    | 16 | 23    | 23 | 24     | 2  |
| Lachlan .....          | 39    | 15 | 15    | 10 | —     | —  | 32    | 23 | 13    | 12 | 19    | 3  | 23     | 37 |
| New Zealand Cape ..... | 33    | 32 | 14    | 13 | 12    | 25 | 26    | 1  | 26    | 18 | 23    | 2  | 22     | 29 |
| Algerian .....         | 30    | 9  | 16    | 5  | 5     | 22 | 29    | 0  | 26    | 12 | 25    | 17 | 22     | 4  |
| Palestine .....        | —     | —  | —     | —  | 34    | 38 | 46    | 21 | 28    | 21 | 22    | 1  | 33     | 0  |
| Early Kherson .....    | —     | —  | —     | —  | 30    | 28 | 45    | 28 | 27    | 36 | 25    | 2  | 32     | 14 |
| Calcutta .....         | —     | —  | —     | —  | 12    | 22 | 30    | 20 | 13    | 31 | 25    | 17 | 20     | 23 |
| Warrigul .....         | —     | —  | —     | —  | —     | —  | 47    | 18 | 18    | 30 | 26    | 10 | 30     | 33 |
| Sunrise x Mulga .....  | —     | —  | —     | —  | —     | —  | 30    | 24 | 13    | 32 | 9     | 31 | 18     | 2  |
| Imbros Island .....    | —     | —  | —     | —  | —     | —  | 18    | 30 | 12    | 39 | 22    | 10 | 18     | 0  |

Early Burt is thus apparently our best grain oat still, though both Palestine and Early Kherson are strong competitors, and for the period during which it has been grown (1927-30) Palestine has a higher mean yield.

In the next table are shown the mean grain and hay returns from the principal varieties of oats over various periods. The varieties are arranged in what appears to be their order of relative importance to us as dual purpose oats.

TABLE XIV.—*Showing Average Grain and Hay Yields of Certain Varieties of Oats.*

| Variety.               | Period.       | Hay Yield per Acre. |    |    | Period.       | Grain Yield per Acre. |    |
|------------------------|---------------|---------------------|----|----|---------------|-----------------------|----|
|                        |               | T.                  | C. | L. |               | B.                    | L. |
| Early Burt .....       | 1927-30 ..... | 1                   | 19 | 42 | 1925-30 ..... | 33                    | 12 |
| Early Kherson .....    | 1927-30 ..... | 2                   | 0  | 28 | 1927-30 ..... | 32                    | 14 |
| Sunrise .....          | 1927-30 ..... | 2                   | 0  | 13 | 1925-30 ..... | 27                    | 3  |
| Scotch Grey .....      | 1927-30 ..... | 1                   | 15 | 89 | 1925-30 ..... | 28                    | 5  |
| New Zealand Cape ..... | 1927-30 ..... | 1                   | 19 | 9  | 1925-30 ..... | 22                    | 29 |
| Algerian .....         | 1927-30 ..... | 1                   | 18 | 50 | 1925-30 ..... | 22                    | 4  |
| Palestine .....        | 1928-30 ..... | 1                   | 13 | 90 | 1927-30 ..... | 33                    | 0  |

#### BARLEY HARVEST.

Barley was sown at the rate of 50lbs. of seed and 1cwt. of superphosphate per acre in Daly's B. (upwards of 50 acres) and the small Field No. 9. The latter was sown about the middle of May, was fed off lightly in July, and subsequently came away



clean and with just sufficient straw growth to carry a heavy crop. The Daly's B. crop was, perforce, sown earlier, germinated irregularly, and was more or less infested with weeds. It suffered more, too, from the November storms.

The results of the barley harvest, together with comparison with previous years' returns, are shown in the next two tables.

TABLE XV.—*Summarising the Barley Returns, 1930.*

| Field.                 | Variety.          | Area.  | Total Yield. | Yield per Acre. |
|------------------------|-------------------|--------|--------------|-----------------|
|                        |                   | Acres. | Bush. lbs.   | Bush. lbs.      |
| No. 9 .....            | Roseworthy Oregon | 5.885  | 191 40       | 32 30           |
| Daly's B .....         | Prior .....       | 29.018 | 489 10       | 16 40           |
|                        | Shorthhead .....  | 13.471 | 220 10       | 16 17           |
| Experiment Plots ..... | —                 | 8.781  | 68 0         | 7 37            |
|                        | Totals .....      | 57.155 | 969 10       | 16 48           |

TABLE XVI.—*Showing General Average Barley Yields on the College Farm, 1921-30.*

| Season.              | Rainfall.  |        | Area.  | Average Yield per Acre. |
|----------------------|------------|--------|--------|-------------------------|
|                      | " Useful " | Total. |        |                         |
|                      | In.        | In.    | Acres. | Bush. lbs.              |
| 1921 .....           | 12.98      | 17.16  | 66.7   | 26 25                   |
| 1922 .....           | 14.90      | 20.00  | 54.1   | 37 38                   |
| 1923 .....           | 25.30      | 27.46  | 5.4    | 19 37                   |
| 1924 .....           | 16.08      | 20.43  | 50.6   | 26 39                   |
| 1925 .....           | 14.18      | 15.65  | 84.6   | 12 31                   |
| 1926 .....           | 16.63      | 18.49  | 130.8  | 9 39                    |
| 1927 .....           | 11.73      | 14.59  | 121.3  | 4 15                    |
| 1928 .....           | 11.58      | 18.03  | 105.7  | 23 31                   |
| 1929 .....           | 9.73       | 13.06  | 78.7   | 6 4                     |
| 1930 .....           | 11.77      | 12.85  | 57.2   | 16 48                   |
| Mean for 27 years .. | —          | —      | —      | 24 38                   |

The variety test plots, again in triplicate as with wheat and oats, included, this year, several imported types, which were tested at the request of maltsters. They proved, however, generally unsuitable for our conditions, chiefly on account of lateness of maturity. The recorded yields in these plots, however, are more or less misleading, as in the case of oats. Thus the figures for Roseworthy Oregon and Shorthhead (almost 12 bags and four bags respectively per acre) do not represent, by any means, the relative crops carried by these varieties prior to the storms, and, as in the case of oats, the later varieties were in a better condition to withstand the winds early in November and thus show up to better advantage than they might have done in more favorable harvesting weather.

The next table shows the details of the test plot results, together with whatever records are available, back as far as 1927.



TABLE XVII.—*Showing Grain Yields of Varieties of Barley Sown on Fallow Land, 1927-1930.*

| Variety.                | 1927. |    | 1928. |    | 1929. |    | 1930. |    | Means. |    |
|-------------------------|-------|----|-------|----|-------|----|-------|----|--------|----|
|                         | B.    | L. | B.    | L. | B.    | L. | B.    | L. | B.     | L. |
| Roseworthy Oregon ..... | 20    | 42 | 40    | 13 | 27    | 18 | 35    | 23 | 30     | 49 |
| Prior .....             | 17    | 40 | 47    | 0  | 25    | 15 | 16    | 26 | 26     | 33 |
| Shorthead .....         | 17    | 38 | 34    | 22 | 35    | 2  | 12    | 6  | 24     | 42 |
| Tunis .....             | —     | —  | 50    | 49 | 27    | 39 | 25    | 45 | 34     | 44 |
| Duckbill .....          | —     | —  | 29    | 23 | 17    | 9  | 16    | 18 | 21     | 0  |
| Beavan's Special .....  | —     | —  | —     | —  | —     | —  | 22    | 29 | —      | —  |
| Spratt Archer .....     | —     | —  | —     | —  | —     | —  | 18    | 44 | —      | —  |
| Plumage Archer .....    | —     | —  | —     | —  | —     | —  | 17    | 36 | —      | —  |

## PEA HARVEST.

Pease were sown in two fields, Graingers A. and Flett's B., at the rate of 90lbs. of seed and 1cwt. of superphosphate per acre, on stubble ground. The varieties and areas sown were Early White Brunswick, 42 acres; and Early Dunn, 24 acres. Throughout the winter and early spring very good growth was made, and in September there seemed every prospect of a good return. The shortage of effective rain at that period, however, caused the pods to set on the small side. The usual attacks by grubs occurred towards the end of October and early November, though their effects were less marked in the Early White Brunswick than in the Early Dunn, which matured a couple of weeks later. Finally, the intermittent showers of November not only delayed harvesting, but also caused the pods to burst and scatter several bushels of grain per acre on the ground. Ultimately the Early White Brunswick returned 7bush. and the Early Dunn 2½bush. per acre. The average yield is represented by the relatively poor return of 5bush. 25lbs., and this is shown in comparison with the yields of previous seasons in the next table.

TABLE XVIII.—*Showing the Average Yield of Pease for Nine Seasons.*

| Season.                           | Rainfall.  |        | Area. | Average Yield per Acre. |
|-----------------------------------|------------|--------|-------|-------------------------|
|                                   | " Useful " | Total. |       |                         |
|                                   | In.        | In.    |       |                         |
| 1916 .....                        | 20.25      | 23.23  | 11.5  | 30 44                   |
| 1917 .....                        | 17.25      | 21.86  | 37.3  | 21 7                    |
| 1924 .....                        | 16.08      | 20.43  | 30.8  | 14 17                   |
| 1925 .....                        | 14.18      | 15.65  | 97.5  | 4 14                    |
| 1926 .....                        | 16.63      | 18.49  | 82.6  | 10 20                   |
| 1927 .....                        | 11.73      | 14.59  | 60.0  | —                       |
| 1928 .....                        | 11.85      | 18.03  | 46.8  | 2 19                    |
| 1929 .....                        | 9.73       | 13.06  | 135.0 | —                       |
| 1930 .....                        | 11.77      | 12.85  | 65.8  | 5 25                    |
| Mean Yield for nine seasons ..... | —          | —      | —     | 9 50                    |

## HAY HARVEST.

Two small fields, Nos. 8 and 3B, were sown with similar series of test plots with wheat, oats, and hay mixtures. These paddocks had been fallowed and well worked, and the mean yields, approximately 36cwts. and 34cwts. per acre respectively, were







The two hay test fields, Nos. 8 and 3n, were sown in similar series of plots so as to provide duplicate results in order to minimise experimental error to a certain extent. The plots were about half an acre in area in No. 8 and one acre each in No. 3n, and the figures quoted in the next table are the mean results of the corresponding plots in the two fields. Varieties of wheat and oats were sown separately and in mixtures in these plots, and the details of the results are shown below.

TABLE XXI.—*Showing Hay Yields Obtained from Wheat and Oats Sown Separately and as Mixed Crops.*

| Crop.          | Variety.                        | Yield per Acre. |    |     | Mean Yield. |    |     |
|----------------|---------------------------------|-----------------|----|-----|-------------|----|-----|
|                |                                 | T.              | C. | L.  | T.          | C. | L.  |
| Wheat .....    | Crostan .....                   | 1               | 17 | 109 | 1           | 13 | 107 |
|                | Regal .....                     | 1               | 14 | 87  |             |    |     |
|                | Ford .....                      | 1               | 12 | 64  |             |    |     |
|                | Galland's Hybrid .....          | 1               | 10 | 54  |             |    |     |
| Oats .....     | Early Burt .....                | 1               | 16 | 75  | 1           | 9  | 20  |
|                | Early Kherson .....             | 1               | 14 | 98  |             |    |     |
|                | Sunrise .....                   | 1               | 5  | 73  |             |    |     |
|                | Lachlan .....                   | 0               | 19 | 56  |             |    |     |
| Mixtures ..... | Gallands Hybrid and Sunrise ... | 2               | 9  | 81  | 2           | 2  | 91  |
|                | Crostan and Early Kherson ....  | 2               | 3  | 61  |             |    |     |
|                | Ford and Early Burt .....       | 1               | 19 | 34  |             |    |     |
|                | Regal and Lachlan .....         | 1               | 18 | 76  |             |    |     |

It will be seen that the mixed crops have all given better returns than any of the wheats or oats sown alone. This is contrary to the results obtained in the last three seasons, but in close agreement with the mean results obtained in such experiments as this over a period of nine years. This comparison, and the average returns over the nine seasons, are shown in the next table.

TABLE XXII.—*Showing Hay Returns from Wheat and Oats Sown Separately and as Mixed Crops, 1922-30.*

| Season.                    | Wheat. |    |     | Oats. |    |     | Mixture. |    |     |
|----------------------------|--------|----|-----|-------|----|-----|----------|----|-----|
|                            | T.     | C. | L.  | T.    | C. | L.  | T.       | C. | L.  |
| 1922 .....                 | 2      | 11 | 77  | 2     | 10 | 103 | 2        | 18 | 86  |
| 1923 .....                 | 2      | 5  | 2   | 2     | 14 | 29  | 2        | 18 | 78  |
| 1924 .....                 | 2      | 0  | 29  | 1     | 12 | 111 | 2        | 3  | 41  |
| 1925 .....                 | 2      | 1  | 48  | 2     | 0  | 74  | 2        | 1  | 15  |
| 1926 .....                 | 2      | 0  | 58  | 1     | 14 | 42  | 2        | 11 | 66  |
| 1927 .....                 | 1      | 18 | 18  | 1     | 12 | 83  | 1        | 7  | 102 |
| 1928 .....                 | 1      | 6  | 79  | 1     | 5  | 73  | 1        | 5  | 61  |
| 1929 .....                 | 0      | 18 | 94  | 0     | 15 | 43  | 0        | 17 | 108 |
| 1930 .....                 | 1      | 13 | 107 | 1     | 9  | 20  | 2        | 2  | 91  |
| Means for nine years ..... | 1      | 17 | 44  | 1     | 15 | 14  | 2        | 0  | 97  |

For the purpose of comparing the relative hay yielding qualities of a number of wheat varieties, the returns from the best dozen hay wheats for the past four years are shown next. The figures for this purpose are now calculated from the returns of the hay cuts taken from the triplicate test plots already referred to, and thus represent the mean yield of three test plots in each case.



TABLE XXIII.—*Showing Hay Returns from the Principal Varieties of Hay Wheats, 1927-30.*

| Variety.                | 1927. |    |     | 1928. |    |     | 1929. |    |    | 1930. |    |     | Means. |    |     |
|-------------------------|-------|----|-----|-------|----|-----|-------|----|----|-------|----|-----|--------|----|-----|
|                         | T.    | C. | L.  | T.    | C. | L.  | T.    | C. | L. | T.    | C. | L.  | T.     | C. | L.  |
| Sirdar .....            | 1     | 18 | 67  | 1     | 19 | 8   | 1     | 2  | 88 | 1     | 15 | 37  | 1      | 13 | 106 |
| King's White .....      | 1     | 18 | 33  | 2     | 1  | 38  | 1     | 2  | 49 | 1     | 11 | 6   | 1      | 13 | 32  |
| Crostan .....           | 1     | 13 | 99  | 2     | 9  | 68  | 1     | 2  | 75 | 1     | 6  | 88  | 1      | 13 | 27  |
| Regal .....             | 2     | 1  | 11  | 2     | 1  | 12  | 0     | 19 | 39 | 1     | 6  | 73  | 1      | 12 | 6   |
| Maharajah .....         | 1     | 19 | 56  | 1     | 15 | 88  | 1     | 1  | 33 | 1     | 10 | 89  | 1      | 11 | 95  |
| Ford .....              | 1     | 8  | 83  | 2     | 9  | 43  | 1     | 0  | 94 | 1     | 7  | 34  | 1      | 11 | 64  |
| Sultan .....            | 1     | 14 | 70  | 2     | 3  | 43  | 1     | 0  | 26 | 1     | 6  | 16  | 1      | 11 | 11  |
| President .....         | 1     | 15 | 19  | 2     | 7  | 13  | 0     | 16 | 3  | 1     | 6  | 15  | 1      | 11 | 10  |
| Captain .....           | 1     | 12 | 107 | 2     | 2  | 103 | 0     | 14 | 51 | 1     | 11 | 86  | 1      | 10 | 60  |
| Leak's Rust-proof ..... | 1     | 2  | 81  | 2     | 7  | 101 | 1     | 0  | 42 | 1     | 9  | 71  | 1      | 10 | 0   |
| Zealand Blue .....      | 1     | 7  | 89  | 2     | 2  | 15  | 0     | 16 | 80 | 1     | 10 | 104 | 1      | 9  | 44  |
| Huguenot .....          | —     | —  | —   | 2     | 6  | 99  | 0     | 18 | 48 | 1     | 10 | 89  | 1      | 12 | 4   |

The success of the relatively new wheats Sirdar and Crostan is again well illustrated in this table, although King's White maintains a very prominent position in the list. The other varieties, which show up well, are all fairly early and hardy, with the exception of Huguenot, which has done relatively well here, even under the hard conditions of the last few seasons.

The relative hay returns from all the oat varieties tested in recent years are shown in the next table.

TABLE XXIV.—*Showing Hay Returns from Different Varieties of Oats, 1927-30.*

| Variety.               | 1927. |    |     | 1928. |    |     | 1929. |    |     | 1930. |    |     | Means. |    |    |
|------------------------|-------|----|-----|-------|----|-----|-------|----|-----|-------|----|-----|--------|----|----|
|                        | T.    | C. | L.  | T.    | C. | L.  | T.    | C. | L.  | T.    | C. | L.  | T.     | C. | L. |
| Early Kherson .....    | 1     | 19 | 1   | 2     | 15 | 106 | 1     | 6  | 108 | 1     | 19 | 7   | 2      | 0  | 28 |
| Sunrise .....          | 2     | 3  | 49  | 2     | 11 | 98  | 1     | 11 | 48  | 1     | 13 | 82  | 2      | 0  | 13 |
| Early Burt .....       | 2     | 0  | 98  | 2     | 13 | 0   | 1     | 5  | 66  | 1     | 18 | 8   | 1      | 19 | 42 |
| New Zealand Cape ..... | 1     | 10 | 24  | 2     | 15 | 107 | 1     | 11 | 9   | 1     | 19 | 7   | 1      | 19 | 9  |
| Algerian .....         | 1     | 3  | 97  | 2     | 11 | 22  | 1     | 13 | 59  | 1     | 17 | 23  | 1      | 16 | 50 |
| Kherson .....          | 1     | 15 | 101 | 2     | 7  | 76  | 1     | 1  | 110 | 1     | 17 | 92  | 1      | 15 | 95 |
| Scotch Grey .....      | 1     | 12 | 69  | 2     | 9  | 5   | 1     | 6  | 88  | 1     | 14 | 81  | 1      | 15 | 89 |
| Lachlan .....          | 1     | 10 | 0   | 2     | 12 | 49  | 1     | 1  | 110 | 1     | 16 | 52  | 1      | 15 | 25 |
| Smyrna .....           | 1     | 8  | 0   | 2     | 6  | 110 | 1     | 3  | 59  | 2     | 0  | 20  | 1      | 14 | 75 |
| Calcutta .....         | 1     | 8  | 78  | 2     | 14 | 66  | 0     | 17 | 19  | 1     | 16 | 37  | 1      | 14 | 22 |
| Guyra .....            | 1     | 11 | 100 | 1     | 16 | 2   | 1     | 5  | 105 | 2     | 2  | 18  | 1      | 14 | 0  |
| Kelsalls .....         | 1     | 7  | 52  | 2     | 4  | 44  | 1     | 3  | 97  | 1     | 15 | 66  | 1      | 12 | 93 |
| Warrigul .....         | —     | —  | —   | 2     | 6  | 61  | 0     | 19 | 75  | 2     | 6  | 56  | 1      | 17 | 64 |
| Imbros Island .....    | —     | —  | —   | 2     | 14 | 91  | 0     | 17 | 0   | 1     | 19 | 35  | 1      | 17 | 5  |
| Sunrise x Mulga .....  | —     | —  | —   | 2     | 4  | 81  | 1     | 3  | 97  | 1     | 14 | 11  | 1      | 14 | 26 |
| Palestine .....        | —     | —  | —   | 2     | 5  | 21  | 0     | 18 | 31  | 1     | 17 | 106 | 1      | 13 | 90 |

The prominence of Early Burt, Early Kherson, and Sunrise, as dual purpose varieties, has already been indicated, and their predominance in mean hay yields is well shown above. Under the unusual conditions provided by dry spring and heavy rains in late October this year, however, some of the later varieties, *e.g.*, Warrigul, Guyra, Smyrna, have given better hay cuts. Even Imbros Island, usually altogether too late to mature properly here, has this year done better than our standard varieties. The character of the season, however, was so unusual that little importance is to be attached to these obviously anomalous relative yields of hay.



## ENSILAGE.

Whereas in normal seasons the crops set apart for ensilage purposes are usually ready to cut for this purpose towards the end of September, it was almost a month later this year before a start could be made with the work. Even the test plots in Ebsary's were, for the most part, too short and irregular in growth for cutting, and the attempt to record the relative yields of different types of ensilage crops had to be abandoned for this season. The best patches only in this field were taken for ensilage, giving about half a normal cut. Crouch's C. and George's were taken, perforce, as being the only considerable areas of crop ready at mid-October. The yields were very poor indeed, approximately a quarter crop, or the equivalent of half a ton of hay. A small amount of material was taken from the headlands of oats sown on fallow, and this was the only good cut of ensilage obtained, though still below normal.

The details of the returns are shown in the next table, and the usual comparison with previous years' records in the one following.

TABLE XXV.—*Summarising the Ensilage Returns, 1930.*

| Field.           | Crop.         | Area.   |     |    | Total Yield. |    |    | Yield per Acre. |  |  |
|------------------|---------------|---------|-----|----|--------------|----|----|-----------------|--|--|
|                  |               | Acres.  | T.  | C. | L.           | T. | C. | L.              |  |  |
| Ebsary's .....   | Various ..... | 19.639  | 68  | 8  | 64           | 3  | 9  | 77              |  |  |
| Crouch's C. .... | Oats .....    | 17.875  | 29  | 18 | 84           | 1  | 13 | 55              |  |  |
| George's .....   | Oats .....    | 100.000 | 158 | 13 | 1            | 1  | 11 | 82              |  |  |
| Headlands .....  | Various ..... | 5.210   | 29  | 8  | 74           | 5  | 12 | 111             |  |  |
| Totals .....     |               | 142.724 | 286 | 8  | 111          | 2  | 0  | 16              |  |  |

TABLE XXVI.—*Showing Yields of Ensilage, 1921-30.*

| Season.                   | Rainfall.  |        | Area. | Total Yield. |    |     | Yield per Acre. |    |     |
|---------------------------|------------|--------|-------|--------------|----|-----|-----------------|----|-----|
|                           | " Useful." |        |       | T.           | C. | L.  | T.              | C. | L.  |
|                           | In.        | Total. |       |              |    |     |                 |    |     |
| 1921 .....                | 12.98      | 17.16  | 19.6  | 141          | 19 | 47  | 7               | 4  | 91  |
| 1922 .....                | 14.90      | 20.00  | 18.5  | 155          | 2  | 76  | 8               | 7  | 59  |
| 1923 .....                | 25.30      | 27.46  | 43.6  | 272          | 1  | 108 | 6               | 4  | 105 |
| 1924 .....                | 16.08      | 20.43  | 56.4  | 216          | 17 | 36  | 3               | 16 | 104 |
| 1925 .....                | 14.18      | 15.65  | 51.1  | 271          | 11 | 58  | 5               | 6  | 22  |
| 1926 .....                | 16.63      | 18.49  | 40.0  | 264          | 11 | 83  | 6               | 12 | 29  |
| 1927 .....                | 11.73      | 14.59  | 84.2  | 261          | 13 | 53  | 3               | 2  | 15  |
| 1928 .....                | 11.85      | 18.03  | 68.4  | 220          | 3  | 10  | 3               | 4  | 39  |
| 1929 .....                | 9.73       | 13.06  | 79.5  | 189          | 11 | 101 | 2               | 7  | 88  |
| 1930 .....                | 11.77      | 12.85  | 142.7 | 286          | 8  | 111 | 2               | 0  | 16  |
| Mean for 25 seasons ..... | —          | —      | —     | —            | —  | —   | 5               | 18 | 7   |

The per acre returns for this year have obviously been depressed by the inclusion of such a large area of indifferent oat crop, and, as the material taken from this area consisted largely of barley grass and other weeds, the quality was extremely poor. The mean yield, as shown on the records just over two tons per acre, is approximately one-third of the normal ensilage crop. It is the lowest average ensilage return recorded since 1919, and the fourth lowest in the recorded cropping history of the College farm. These facts further demonstrate the serious risk incurred in cropping on any but well-worked fallow land in a season such as that of 1930.



## INCREASED PRODUCTION.

[An Address Delivered, by MR. F. COLEMAN, Chairman Advisory Board of Agriculture, at the Lyndoch Conference, February 26th, 1931.]

I have been asked to address you this evening upon some "Phase of the Farmers' Problems." By this I understand some particular view of the question as to how the farmer and his family are to continue to live in reasonable comfort and independence.

Our natural sources of wealth are so restricted to the cultivation of the soil that the farmer, in the sense of being a primary producer, becomes of vital importance. Had South Australia coal fields, great mineral wealth, payable copper mines, natural timber supplies, rivers, waterfalls, or lakes at high altitudes like Tasmania, we could get reasonably cheap power, but, except the wind, South Australia has no sources of power as other States have, and so our secondary industries must of necessity be limited and cannot compete in importance with our primary ones. How, then, are we to develop our primary, and especially our export primary industries whose importance is so vital to our very existence?

I do not propose to discuss our wool industry, nor sheepfarming just now, important as they are, beyond pointing out that the export lamb trade is again claiming attention and is well worth exploring; there is a move in this direction and it deserves our best encouragement and practical support.

The wheatgrower is having a difficult and a lean time. I doubt if all the talk here and in other countries about orderly and controlled marketing is really helping us. Prices will, I am satisfied, improve, if for no other reason than that present prices are unremunerative. It is not possible to continue to grow wheat at 1s. 6d. to 2s. a bushel on the farm, and those who can will devote their land to other crops. At the same time I would strongly advise the wheatgrowers of South Australia to put under wheat as much as they possibly can, consistent with good wheatgrowing practice, this coming season, and to fallow a record area for next year's seeding in full faith that the returns will justify this course, and the State as a whole benefit.

The South Australian farmer has been mainly a wheatgrower. We cannot altogether blame him; he knows how to grow wheat, he has been brought up in a fairly hard school, but has learnt his lessons; he has had to contend with an inadequate and capricious rainfall, and over a large portion of this State with calcareous soils not naturally rich in phosphates. But our farmers have, in spite of adverse conditions, especially during recent years, produced their tale of wheat and at prices averaging 5s. 3d. at Port Adelaide. He has found wheatgrowing a profitable pursuit, not too exacting of his time, allowing of a spell occasionally in the autumn, possibly a fortnight's holiday, a chance to travel over the State, attend the Conferences of the Agricultural Bureau, thereby gaining knowledge of men and things, of shows with visits to the city or seaside. He has not felt the need of closer daily attention to the minor farm economies or production. There has not been the necessity to give attention to dairying for instance, and he has not troubled to raise calves, or pigs or poultry, but conditions have changed.

### THE DAIRYING INDUSTRY.

In the Lower North—the district this Conference of Bureaux represents—there are 4,420 holdings, on only 155 of which 10 cows or more are kept, and only on 106 of such farms is dairying the main source of income—that is less than 2½ per cent. Again, in this district there are only 814 cowkeepers with from five to nine cows, only 81 with from 10 to 14, and only 74 farmers with 15 cows or more. According to the Government Statistician there are 1,170 farms in this district on which no cows are to be found at all.

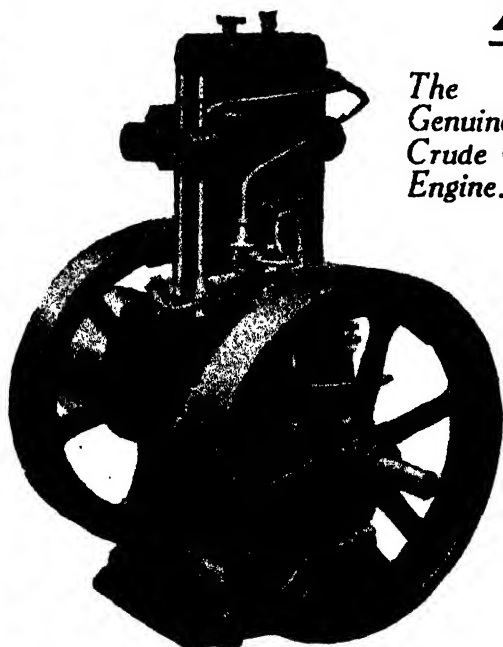


These figures are suggestive, and help to provide the answer to the question why South Australia in 1929 imported 1,697 tons of butter, valued at £296,983, and in 1930 imported 1,370 tons, valued at £239,820. Does anyone really think there is the need for us in this State to import over one-quarter of a million pounds' worth of butter a year from the Eastern States? Surely there is not.

I am not advocating dairying for all our farmers in the Lower North district, but surely 3½ per cent. of the farms with 10 cows or over is a ridiculous proportion. Out of over 4,000 holdings we might look for one-tenth at least carrying 10 cows or over. And these times call for the fullest development of our holdings, and especially greater production where there is a small margin of remuneration.

In this district, including such country as that between Riverton and Clare and out towards the Hoyleton and Blyth plains, and again round Lyndoch and Gawler, we have good land, a reliable and adequate rainfall, and a suitable climate for dairying. Outside these favored districts we find such country as at Eudunda, open, undulating, with but 17in. rainfall, yet round Eudunda there are eight or ten farmers who have given the dairy cow a fair chance, and the cow has responded to that attention as she always will. I made it my business to visit eight of those farms last spring, and was told that but for the cows the farmers would not have been able to carry on in some cases. That was last year. I do not know what sort of crops they harvested this season, but we all know that the feeble price for wheat would return very little, if any, beyond the cost of cropping. I feel sure that those who have cows are much better off than those who have no dairy cattle.

*I challenge any farmer present here to show that the Eudunda district is more adapted to dairying than the average of the Lower North. What has been and is being done at Eudunda to-day by a few practical men can, I am sure, be done in many places in this Lower North Conference District, where the conditions are certainly better, because there is heavier rainfall, and on the whole probably better climatic conditions.*



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I am, of course, aware that to stock up a farm with good dairy cows at the present time is not a practical proposition; good cows are difficult to obtain. They would be expensive and cash is very scarce. But are we making the best of such stock as we have? Are we rearing the best heifer calves? Are we feeding such cows as we may have to the best advantage. We need not grudge giving our cows good chaffed hay. The days when the cows were turned out after milking into a bare paddock or among stinkwort are, I hope, past. At present price of hay in this district it will certainly pay to feed to dairy cows, and bran at £3 15s. to £4 a ton is not too dear a concentrate with butter fat at 1s. 4d. a pound. Are we who keep cows trying to improve our dairy cattle? Are we doing our best by the use of sires from heavy milking and butter production strain to breed heifers that will be better producers than their mothers? Do we pay attention to what is termed a balanced ration, by which we mean that the feed supplied to our milch cows shall be such that full nutritive value will be used by the cow, that the albuminoid ratio—that is, the proportion of flesh forming to fat producing material is such that the food is used to the best advantage, and no portion wasted. The ideal proportion or ration is that of our natural spring pasture just as the grasses are coming into flower. At that time the cattle are sleek, in splendid condition, and at the peak of production, the ratio is about 1 to 5 of albuminoids or flesh-forming material to carbohydrates or fats. At this time of the year when the grazing is poor, the grass dry and fibrous, and lost its flavor and quality, it is necessary to feed by hand, and to supply enough bulk to fill the cow's paunch for adequate digestion and at the same time concentrates to supply a ratio of 1 to 5 so that she will continue to produce milk. If the ratio is much greater, say 1 to 15 or 1 to 20, some of the food is not fully used and is wasted, we need to feed economically.

The following are some examples of balanced rations. The quantity can, of course, be adjusted to the requirements of the individual cow, and the amount of roughage or pasture obtainable.

For a cow giving 3 gallons of milk a day: Wheaten hay chaff, 20lbs.; bran, 4lbs.; and meat meal, 2lbs.; or oaten chaff, 20lbs.; crushed oats, 4lbs.; meat meal, 2lbs.

For a cow giving 4 gallons: Wheaten hay chaff, 20lbs.; crushed oats, 4lbs.; bran, 4lbs.; and meat meal, 2lbs.

For a cow giving 3 gallons to 4 gallons: Oaten hay chaff, 20lbs.; bran, 4lbs.; crushed oats, 4lbs.

#### DAIRYING AT EUDUNDA.

In the Eudunda district last spring the average return from seven farmers was £24 5s. per cow per year; individual returns by some of the farmers averaged from £20 to £31 per cow. This is a better average per cow than that of my cows and heifers, which works out at about £16 per cow per year during the past 10 years. This year it looks like £15 per head. You will probably be able to figure out what it costs per year for grazing and additional hand-feeding necessary to keep your milch cattle in good condition and profit. I think that at £10 per head you would be getting a better price for your wheaten or oaten hay and your oats than you can get by marketing them in the usual way in the open market. The balance or profit over the cost of feeding of £5 or perhaps £10 a cow is not unduly high; this is what you get for the trouble and labor of looking after and milking your cow. The cash fortnightly from the cream factory will be very welcome, and go a long way towards paying the local store for groceries, &c. I am pretty sure those Eudunda farmers, some of them dependent for a living upon the returns from their cows, would reckon £10 at least beyond all cost of feeding and outlay other than their labor.

#### GREEN FODDERS AND ENSILAGE.

Since successful dairying depends so much on liberal as well as judicious feeding, it is necessary to plan ahead and put in a few acres of barley or oats for early green feed or grazing. Later in the spring, when feed is plentiful, and just before hay-cutting commences, cut some green stuff and put it in a pit or hole, such as an old disused underground tank or cellar, cover with straw or bags to exclude the air, and



# Scientific Farming!

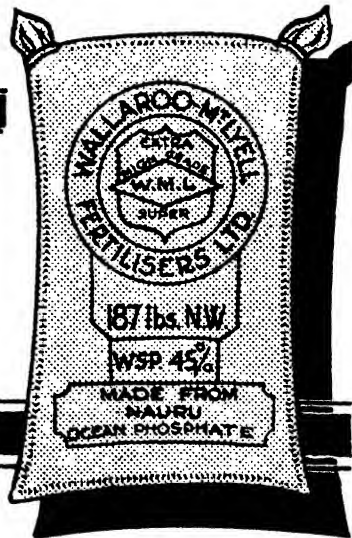
**THAT** is the only proper response to present troubles—**THAT** is the road to solvency and restored prosperity. . .

Economies are necessary, but to cut the application of super in this years farming effort would be a fatal mistake. .

Science and Economy dictate the liberal use of

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for it lowers costs by increasing yields.





weight it down heavily with dirt or fencing posts, or both. If the air is well excluded, the green crop good fodder, and it is well pressed down, the silage will turn out well, and prove very useful for the cows during the late summer or autumn when only dry feed is otherwise available.

Between the 12th and 18th November last I put about 8 tons of green wheaten and oaten hay into a hole 18ft. x 8ft. x 4ft. 6in. that had been dug out not far from the milking shed. This was opened on January 1st, and there was very little loss—less than 6in. round the sides and on top. It had been covered with wild artichokes, then the earth from the hole was heaped on top. This little pit has again been filled with maize and is still full of maize silage. The maize was drilled in on fallow in October, when we had nearly 4ins. of rain.

Less than 1½ins. has fallen since, yet without any irrigation or watering beyond the little rain referred to, the crop grew about 3ft. 6ins. to 4ft., and provided a good cutting for the cows during January, and some 9 tons has been chaffed into the pit.

Of course, a properly built silo is the correct way of preserving fodder for times of scarcity, but as a temporary means to get silage these holes dug out do answer the purpose to some extent. In some cases I understand the pit has been scooped out with a scoop and horses or tractor, then when filled, the earth taken out is again scooped on top, and this has proved quite satisfactory, with very little loss. Succulent food is very helpful for milch cattle, and though involving a little more labor in handling, is worth while, and I recommend farmers to try putting some of their green crop into silage next spring.

We should use much more butter and dairy produce than we do. In New South Wales the consumption two years ago was 35lbs. per head, while South Australia only uses 23lbs. and Australia 29lbs. It is claimed that local consumption should reach 87,000 tons, and it might be raised to 100,000 tons, if more attention was devoted to home markets. In any case there is room for greater production in South Australia.

#### ESSENTIAL POINTS SUMMARISED.

I repeat the points I have brought forward:—

*Conservation of Fodder.*—Can you imagine a business man starting some manufacturing enterprise without considering and providing for his raw material, the efficiency of his machinery, and the quality of his finished product? So with dairying we must provide the food, the cows, and conveniences for the milk and cream.

*Improve pasture* by top dressing, and provide for additional feed during late autumn and winter, when cattle need more feed to keep up the animal heat in addition to providing milk. Replace grass pastures with minerals taken.

*Test the cows* to see which are worth keeping and feeding. With Jerseys 400lbs. butter fat should be aimed at, and an average of 300lbs. ought to be reached, and I think that 250lbs. in the spring and summer lactation is better than the same quantity in winter, for though values are higher, it takes extra feeding to maintain condition, warmth, &c.

*Put down some Silage;* it will keep indefinitely, free from vermin, will not burn, hence no fire risk, and is a very essential roughage for dairy cattle.

*Provide shelter* for livestock; this will save food and afford comfort for the cows in winter.

*Rear the best calves* and give them the best attention.

*Care for the cream.* As the milk comes from the cow it is, generally speaking, quite right. Of course, certain weeds will flavor it, but as a rule the milk is good; the after treatment is responsible for the loss of quality, and there is a great deal too much second quality cream sent to the factories.

Associated closely with dairying are pigs, and at present prices for grain it will pay to feed wheat with milk to pigs; 7lbs. skim milk and 4½lbs. grain for pig feeding is a well-recognised ratio, and an economical one to use.



## • WHITE OIL SPRAY AND MANURING OF APRICOT TREES.

[By Mr. J. B. HARRIS, District Horticultural Instructor.]

Following upon experimental work with summer oil sprays carried out at the State Experimental Orchard during 1927-28 season, it was decided that experimental spraying with white oil be carried out in the orchard of Messrs. S. and L. Plush, under supervision, so far as possible, of the local Horticultural Instructor. Messrs. P. and F. Warnecke (Nuriootpa) and F. H. Lock (Angaston) also used white oil fairly extensively to combat codlin and other pests during the past season, and later in this paper reference is made to some of their observations.

### TESTS AT LIGHT'S PASS.

For purposes of comparison, results from three plots—A, B, and C—are given, each plot consisting of 10 trees. Each plot received five sprayings during the past season, the dates of spraying being October 18th, November 4th, December 4th, December 23rd, and January 25th. Plots A and C were each sprayed five times with arsenate of lead mixed as 1lb. of paste to 15galls. of water. Plot B's five sprayings were—First, 1lb. arsenate of lead to 15galls. of water; second, 1gall. alboleum in 50galls. water; third, arsenate of lead 1.15 plus alboleum 1.50; fourth, 1gall. alboleum in 50galls. water; and fifth, 1gall. alboleum in 50galls. water. Plots B and C are alongside each other, plot C being the one on which molasses trapping tests have been carried out during the past four years. Plot B may have derived some slight benefit from this trapping; plot C almost certainly has. Plot A is a check, or comparative plot, in another part of the orchard. All the trees have been bandaged, and the grubs in bandages destroyed periodically.

Plot A, the comparative plot, sprayed with arsenate of lead only, picked 46 cases of apples, of which 26 cases, or 56 per cent., were codlin infested. Plot B, oil and lead arsenate sprayed, picked 69 cases of apples, of which eight cases, or 11 per cent., were codlin infested. Plot C, with five lead-arsenate sprayings and molasses traps, picked 78 cases of apples, of which 25, or 32 per cent., were codlin infested.

It has been suggested that plot A, sprayed with arsenate of lead only, owing to its situation in the orchard, does not provide a fair standard for comparison with plot B, which was sprayed with oil and arsenate of lead. Without further discussing that point, let us compare plots B and C, which are situated alongside each other in the

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same block of trees. Plot C, with five arsenate sprayings, had the advantage of a molasses bait trap in each tree, and experience of the past four years has indicated that these traps are definitely helpful in producing a greater percentage of clean fruit. Plot B, oil and arsenate sprayed, had no such advantage, but produced 21 per cent. more clean fruit than plot C. Taking the average crop from plots B and C as 73½ cases, the proportionate increase from plot B is rather more than 15 cases, or 1½ cases per tree.

The cost of spray material per tree, allowing 2galls. of spray per tree, each spraying was—Plot C, approximately 6½d. per tree for the season; and plot B, arsenate and oil combination, approximately 3d. for the arsenate of lead at 10d. lb., and approximately 1s. for alboleum at 7s. 6d. per gallon, or 1s. 3d. per tree. Therefore the increased cost of spray, using alboleum and arsenate combined, is 8½d. a tree, whilst value of the increased quantity of clean fruit in this case was 6s. per tree.

This merely embodies results of one season's test carried out on 20 trees, and although the results should not be taken as conclusive, they should encourage further investigation by practical growers in addition to further experiments along these lines. Dr. Pettey, Entomologist to the Department of Agriculture in South Africa, has drawn attention in a recent bulletin to the danger of fruit being damaged by summer oil sprays. The characteristic damage of which he speaks—a discoloration of the skin in vicinity of the calyx—has been noticed only on certain varieties in South Africa, and in this district has been found only on Strawberry Pippin apples in Mr. Lock's orchard, although Rome Beauties, Northern Spys, Jonathans, and Dunn's Seedlings were also sprayed with white oil. Messrs. Warnecke Bros. concentrated their applications of white oil on portions of their orchard where woolly aphid and red spider were prevalent. Control of these pests, as of codlin, is stated to have been satisfactory.

#### MANURIAL TESTS WITH APRICOT TREES AT LIGHT'S PASS, 1929 AND 1930.

A test to determine, so far as possible, the effect of superphosphate applied to apricot trees was commenced in the orchard of Messrs. S. and L. Plush, Light's Pass, in September, 1928. The block selected is situated alongside the road running from Plush's corner to Stockwell, and consists of 56 trees about 15 years old, the trees being approximately the same in size, vigor, and general cropping capacity. The soil, which shows very little surface variation throughout the block, is a red, sandy loam. To provide a basis for comparison, the plots were set out so that certain groups of trees were left unmanured, and between manured and unmanured groups, rows of barrier trees were left to utilise any dissolved fertilizer which might flow in a lateral direction from the manured to the "check" or unmanured plot.

The row at the northerly end of the block was eliminated from the test in consideration of the advantage which is frequently seen in an outside row where trees meet competition from one side only. At this juncture Mr. Harris displayed a plan of the plots, showing the 20 manured trees for comparison with 15 check trees; results being derived from an average of the trees treated. This plan was adopted to admit of manuring the maximum number of trees while maintaining the necessary barrier rows and check plots. All manures applied have been broadcast by hand on an area corresponding roughly with spread of the branches of the tree to which manure was being applied; the manures being immediately harrowed in.

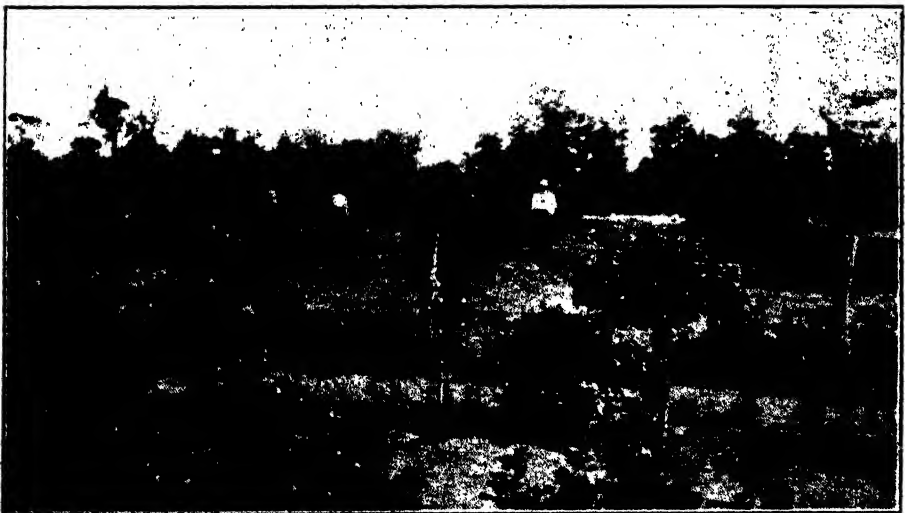
The first application was 6lbs. of superphosphate, 45 per cent. W.S.P., made on September 20th, 1928. Good cultivation was maintained throughout the season, which was exceptionally dry. Manured trees ripened the bulk of their fruit rather earlier than unmanured trees. The 20 trees which received application of 6lbs. 45 per cent. W.S.P. on September 20th, 1928, produced in January, 1929, 53½ cases of fruit; an average of 2.675 cases per tree. The 15 trees not manured produced in January, 1929, 43 cases of fruit; an average of 2.866 cases per tree. The manured trees thus produced approximately 12lbs. per tree less fruit than those not manured.



The test was continued during 1929-30 season, but a variation was made on the manured plot which contains eight trees by addition of sulphate of ammonia at the rate of 2lbs. per tree to each of the eight trees. It was considered, after experience of the previous year, that 12 trees treated with super only would sufficiently indicate the effect of that manure, and the eight trees treated with super and sulphate of ammonia would indicate the influence of the latter. All the manured trees received 6lbs. of 45 per cent. W.S.P. on August 30th, 1929; the eight trees in the smaller plot receiving 2lbs. sulphate of ammonia per tree on October 7th, 1929. Quantities of fruit harvested from the plots were:—12 trees, with super only, produced 47 cases, or 3.916 cases per tree; 15 trees, with no manure, produced 62½ cases, or 4.166 cases per tree; eight trees, with super and sulphate of ammonia, produced 35½ cases, or 4.437 cases per tree. Expressed in another form, on the basis of 54lbs. of fruit per case:—Trees which received super only produced an average of 211lbs. 8ozs. per tree; trees which received no manure produced an average of 225lbs. per tree; and trees which received super and sulphate of ammonia produced an average of 239lbs. 10ozs. per tree.

Experience of the past two seasons tends to show that these apricot trees do not benefit by addition of super alone. Sulphate of ammonia and super used in conjunction have given an increase during the past season, when tested on eight trees, of approximately half a case (28lbs. 2ozs. exactly) of fruit per tree over trees manured with super only, and an increase of 14lbs. 10ozs. over trees which received no manure. Results so far obtained in this test are not intended to be conclusive. The test is being continued, but results so far obtained may be of interest and serve as a guide to others in this district who are interested in manuring of apricot trees.

Further orchard experiments which are being conducted under auspices of Bureau Branches in this district relate to codlin moth trapping, manuring of apple trees with sulphate of ammonia, and a pruning test on apricot trees which has been instituted by the Chief Horticultural Instructor.



Mr. F. L. Johnson's garden at Wudinna, Eyre's Peninsula. This garden contains a large collection of fruit trees, amongst which there are many new varieties.



# FERTILISERS ACT, 1918—ANALYSES OF FERTILISERS.

Following are results of Analyses obtained by the Government Agricultural Analysts from samples procured and supplied during the year ended December 31st, 1930.

NOTE.—Deficiencies greater than permitted under Section 12 of the Act are shown in bold type.

| Sample No. | Name of Firm and Fertiliser.                | Phosphate.          |                     |                     |                     |                     |                     |                     |                     |                     |                     | Nitrogen.           |                     | Nitrogen as Nitrates. |                     |
|------------|---------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|
|            |                                             | Water Soluble.      |                     | Citrate Soluble.    |                     | Acid Soluble.       |                     | Total.              |                     |                     |                     | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee.   | Result of Analysis. |
|            |                                             | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. |                     |                     |                       |                     |
| 2168       | Adelaide Chemical and Fertiliser Co., Ltd.— |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                       |                     |
| 2209       | A.C.W. Phosphate                            | 22.0                | 20.8                | 3.0                 | 3.2                 | 28.0                | 31.3                | 53.0                | 56.3                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1877       | Bonedust                                    | —                   | 20.8                | —                   | —                   | 40.0                | 40.8                | 40.0                | 40.8                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1877       | Bone Super.                                 | 20.0                | 20.7                | 10.0                | 9.2                 | 4.0                 | 8.8                 | 34.0                | 38.7                | 3.25                | 3.3                 | —                   | —                   | —                     | —                   |
| 2121       | Bone Super.                                 | 20.0                | 20.1                | 10.0                | 13.3                | 4.0                 | 10.8                | 34.0                | 44.0                | 1.60                | 1.6                 | —                   | —                   | —                     | —                   |
| 2312       | Bone Super.                                 | 20.0                | 22.4                | 10.0                | 11.7                | 4.0                 | 10.5                | 34.0                | 44.8                | 1.60                | 1.6                 | —                   | —                   | —                     | —                   |
| 1876       | Bone Super.                                 | 48.0                | 49.0                | —                   | —                   | —                   | —                   | 48.0                | 48.0                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1943       | 43% Super.                                  | 48.0                | 48.8                | —                   | —                   | —                   | —                   | 48.0                | 48.8                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1942       | Guano Super.                                | 97.0                | 21.8                | 3.0                 | 2.1                 | 3.0                 | 3.5                 | 33.0                | 38.4                | —                   | —                   | —                   | —                   | —                     | —                   |
| 2113       | Guano Super.                                | 27.0                | 23.4                | 3.0                 | 4.6                 | 3.0                 | 2.6                 | 33.0                | 35.6                | —                   | —                   | —                   | —                   | —                     | —                   |
| 2166       | Guano Super.                                | 27.0                | 27.2                | 3.0                 | 3.8                 | 3.0                 | 3.1                 | 33.0                | 34.1                | —                   | —                   | —                   | —                   | —                     | —                   |
| 2310       | Guano Super.                                | 27.0                | 32.9                | 3.0                 | 3.6                 | 32.0                | 79.8                | 82.0                | 79.8                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1875       | Island Phosphate                            | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2120       | Mineral Super.                              | 36.0                | 36.2                | —                   | —                   | —                   | —                   | 36.0                | 36.2                | —                   | —                   | —                   | —                   | —                     | —                   |
| 231        | Special Mixture (No. 71)                    | 7.5                 | 8.0                 | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 1873       | Top Special Super                           | 45.0                | 45.0                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 1944       | Top Special Super                           | 45.0                | 45.0                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2160       | Top Special Super                           | 45.0                | 46.0                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2164       | Top Special Super                           | 45.0                | 43.0                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2165       | Top Special Super                           | 45.0                | 45.5                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2167       | Top Special Super                           | 45.0                | 45.1                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
| 2211       | Top Special Super                           | 45.0                | 43.9                | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                   | —                     | —                   |
|            | Cheese Fertilisers Limited—                 |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                       |                     |
| 1705       | 45 Super                                    | 45.0                | 46.2                | 1.0                 | 2.2                 | 2.0                 | 2.0                 | 48.0                | 50.4                | —                   | —                   | —                   | —                   | —                     | —                   |
| 1874       | 45 Super                                    | 45.0                | 45.0                | 1.0                 | 1.6                 | 2.0                 | 1.4                 | 48.0                | 48.0                | —                   | —                   | —                   | —                   | —                     | —                   |
| 2116       | 45 Super                                    | 45.0                | 48.1                | 1.0                 | 2.7                 | 2.0                 | 1.7                 | 48.0                | 52.6                | —                   | —                   | —                   | —                   | —                     | —                   |

\* Reserve Sample.



ANALYSIS OF THE FILMS—continued.

[illegible]



## ANALYSES OF FERTILIZERS—continued.

| Sample No. | Name of Firm and Fertilizer.              | Phosphate.                                       |                     |                     |                     | Nitrogen.           |                     | Nitrogen as Nitrate. |                     |
|------------|-------------------------------------------|--------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|
|            |                                           | Water Soluble.                                   |                     | Citrate Soluble.    |                     | Add Soluble.        |                     | Total.               |                     |
|            |                                           | Vendor's Guarantee.                              | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee. | Result of Analysis. | Vendor's Guarantee.  | Result of Analysis. |
|            |                                           | %                                                | %                   | %                   | %                   | %                   | %                   | %                    | %                   |
|            | Greco Fertilizers, Limited—continued—     |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 3119       | 45 Super.                                 | 45.0                                             | 46.0                | 1.0                 | 3.7                 | 2.0                 | 1.9                 | 48.0                 | 50.6                |
| 3120       | 45 Super.                                 | 45.0                                             | 46.2                | 1.0                 | 3.1                 | 2.0                 | 2.9                 | 48.0                 | 51.2                |
| 3121       | 45 Super.                                 | 45.0                                             | 44.1                | 1.0                 | 3.5                 | 2.0                 | 1.3                 | 48.0                 | 48.9                |
| 3122       | 45 Super.                                 | 48.0                                             | 48.3                | 1.0                 | 4.1                 | 3.0                 | 1.3                 | 52.0                 | 53.7                |
| 3123       | 50/50 Phosphate                           | 20.0                                             | 21.0                | 4.0                 | 3.4                 | 38.0                | 38.1                | 62.0                 | 62.6                |
| 3124       | Guano Super.                              | 27.0                                             | 26.5                | 8.0                 | 0.8                 | 3.0                 | 3.9                 | 33.0                 | 34.2                |
| 3125       | Guano Super.                              | 27.0                                             | 27.0                | 8.0                 | 1.9                 | 3.0                 | 4.1                 | 33.0                 | 36.9                |
| 3126       | Mixed Manure                              | 20.5                                             | 26.1                | 8.0                 | 7.1                 | 6.5                 | 4.9                 | 35.5                 | 38.1                |
| 3127       | Mixed Manure                              | 20.5                                             | 20.2                | 8.0                 | 7.1                 | 6.5                 | 8.6                 | 35.5                 | 35.0                |
| 3128       | Super. and Guano                          | 16.0                                             | 20.4                | 12.0                | 7.3                 | 22.0                | 21.0                | 50.0                 | 48.7                |
|            | Crompton & Son, Limited—                  |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 1948       | Black and Bone Manure                     | —                                                | —                   | —                   | —                   | 25.0                | 24.1                | 25.0                 | 24.1                |
| 1949       | Pure Bone-dust                            | —                                                | —                   | —                   | —                   | 42.0                | 42.6                | 42.0                 | 42.6                |
| 1950       | Special Bone Manure                       | —                                                | —                   | —                   | —                   | 35.0                | 35.9                | 35.0                 | 35.9                |
|            | Hodmann, H. W.—                           |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 3129       | Pure Bone Manure                          | —                                                | —                   | —                   | —                   | 50.0                | 51.1                | 50.0                 | 51.1                |
| 1705       | Bone Manure                               | —                                                | —                   | —                   | —                   | —                   | —                   | 29.0                 | 29.1                |
| 1707       | Bone Manure                               | —                                                | —                   | —                   | —                   | —                   | —                   | 29.0                 | 30.0                |
|            | McKerrian Abattoirs Board—                |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 1945       | Black Manure                              | —                                                | —                   | —                   | —                   | —                   | —                   | —                    | —                   |
| 1946       | No. 1 Bone Manure                         | —                                                | —                   | —                   | —                   | 25.0                | 27.2                | 25.0                 | 27.2                |
| 1947       | No. 2 Bone Manure                         | —                                                | —                   | —                   | —                   | 25.0                | 30.3                | 25.0                 | 30.3                |
|            | Subert, Sharp, & Bishop, Limited—         |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 2302       | Quality Fertilizer                        | —                                                | —                   | —                   | —                   | 30.0                | 32.7                | 30.0                 | 32.7                |
|            | S. A. Gas Co.—                            |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 2053       | Superphosphate of Ammonia                 | —                                                | —                   | —                   | —                   | —                   | —                   | 20.0                 | 20.8                |
|            | The Phosphate Co.-op. Co., of Aust. Ltd.— |                                                  |                     |                     |                     |                     |                     |                      |                     |
| 1879       | Pure Superphosphate                       | (P <sub>2</sub> O <sub>5</sub> Soluble in Water) | 20.5                | 0.5                 | 1.13                | (Citrate Insoluble) | 1.0                 | —                    | —                   |
| 2117       | Wallaroo-Mt. Lyall Fertilizers, Limited—  | —                                                | —                   | —                   | —                   | —                   | —                   | —                    | —                   |
| 2305       | Bone-dust                                 | —                                                | —                   | —                   | —                   | 40.0                | 45.4                | 40.0                 | 45.4                |
| 2306       | Bone-dust                                 | —                                                | —                   | —                   | —                   | 40.0                | 44.0                | 40.0                 | 44.0                |
| 2307       | Guano Super.                              | 27.0                                             | 26.7                | 8.0                 | 3.8                 | 3.0                 | 4.8                 | 33.0                 | 33.3                |
| 2308       | Standard Super.                           | 36.0                                             | 35.7                | 5.0                 | 5.0                 | 3.0                 | 4.8                 | 36.0                 | 35.7                |
| 2309       | Wheat Manure                              | 28.0                                             | 32.3                | —                   | —                   | —                   | —                   | 45.0                 | 47.3                |
| 1872       | W. M. L. Extra High Grade Super.          | 45.0                                             | 47.3                | —                   | —                   | —                   | —                   | 45.0                 | 47.3                |
| 2118       | W. M. L. Extra High Grade Super.          | 45.0                                             | 45.4                | —                   | —                   | —                   | —                   | 45.0                 | 45.4                |
| 2304       | W. M. L. Extra High Grade Super.          | 45.0                                             | 46.0                | —                   | —                   | —                   | —                   | 45.0                 | 46.0                |
| 2305       | W. M. L. 45 % Super.                      | 48.0                                             | 47.2                | —                   | —                   | —                   | —                   | 48.0                 | 47.2                |



ANALYSES OF FERTILISERS—continued

[illegible]



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.  
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

| Competitors.             | Address.            | Score for Month ending February 28th, 1931. |                         |                         |         |
|--------------------------|---------------------|---------------------------------------------|-------------------------|-------------------------|---------|
|                          |                     | Bird No. and Eggs Laid.                     | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Williams, W. R. ....     | Frewville .....     | (1) *                                       | (2) †                   | (3) *                   | —       |
| Williams, W. R. ....     | Frewville .....     | (4) 142                                     | (5) 159                 | (6) *                   | 301     |
| Williams, W. R. ....     | Frewville .....     | (7) 193                                     | (8) 201                 | (9) 248                 | 642     |
| Wilkinson, F. W. ....    | Lower Light .....   | (10) 222                                    | (11) 174                | (12) *                  | 396     |
| Wilkinson, F. W. ....    | Lower Light .....   | (13) 223                                    | (14) 231                | (15) *                  | 454     |
| Pearman, E. D. ....      | Rosewater .....     | (16) 155                                    | (17) *                  | (18) *                  | 155     |
| Pearman, E. D. ....      | Rosewater .....     | (19) 205                                    | (20) 200                | (21) 189                | 594     |
| Langmead, E. R. ....     | Croydon .....       | (22) *                                      | (23) *                  | (24) 186                | 186     |
| Burton, C. J. C. ....    | Mallala .....       | (25) 221                                    | (26) 199                | (27) 226                | 646     |
| Heath, H. E. ....        | Mile End .....      | (28) 229                                    | (29) *                  | (30) 189                | 418     |
| Heath, H. E. ....        | Mile End .....      | (31) 183                                    | (32) 175                | (33) 115                | 473     |
| Gurr, A. & H. ....       | Scott's Creek ..... | (34) 160                                    | (35) 199                | (36) 222                | 581     |
| Howard, T. W. ....       | Woodville .....     | (37) 181                                    | (38) 186                | (39) 199                | 546     |
| Osborn, E. L. ....       | Camden .....        | (40) *                                      | (41) 227                | (42) 208                | 435     |
| Curtis, W. R. ....       | Cottonville .....   | (43) 165                                    | (44) 230                | (45) 208                | 603     |
| Gameau, V. F. ....       | Woodville .....     | (46) 178                                    | (47) 212                | (48) 170                | 560     |
| Gameau, V. F. ....       | Woodville .....     | (49) 207                                    | (50) 147                | (51) 190                | 544     |
| Aird, J. R. & Son .....  | Kilkenny .....      | (52) 162                                    | (53) 209                | (54) 211                | 582     |
| Simpson, Mrs. A. M. .... | Fullarton Estate .. | (55) *                                      | (56) 145                | (57) *                  | 145     |
| Barrett, L. ....         | Angaston .....      | (58) 162                                    | (59) 172                | (60) 210                | 544     |
| Barrett, L. ....         | Angaston .....      | (61) *                                      | (62) 134                | (63) 220                | 354     |
| Barrett, L. ....         | Angaston .....      | (64) 187                                    | (65) 147                | (66) 176                | 510     |
| Lamerton, E. A. ....     | Edwardstown .....   | (67) 163                                    | (68) 95                 | (69) 220                | 478     |
| Wiese, W. ....           | Cabra .....         | (70) 255                                    | (71) 227                | (72) 207                | 689     |
| Wiese, W. ....           | Cabra .....         | (73) 216                                    | (74) 218                | (75) 202                | 636     |
| Bishop, O. W. ....       | Clarence Park ..... | (76) 207                                    | (77) 139                | (78) 200                | 546     |
| Uriwin, A. P. ....       | Balaklava .....     | (79) *                                      | (80) †                  | (81) 198                | 198     |
| Riggs, N. ....           | Camden Park .....   | (82) 235                                    | (83) 196                | (84) *                  | 431     |
| Riggs, N. ....           | Camden Park .....   | (85) 206                                    | (86) 162                | (87) 195                | 563     |
| Hutton, M. E. ....       | Clarence Park ..... | (88) 193                                    | (89) 221                | (90) 231                | 645     |
| Andrewartha, A. H. ....  | Underdale .....     | (91) 152                                    | (92) 196                | (93) 196                | 544     |
| Vowels, C. C. ....       | Westbourne Park ..  | (94) †                                      | (95) 192                | (96) *                  | 192     |
| Vowels, C. C. ....       | Westbourne Park ..  | (97) 232                                    | (98) 211                | (99) †                  | 443     |
| Vowels, C. C. ....       | Westbourne Park ..  | (100) 226                                   | (101) †                 | (102) *                 | 226     |
| Vowels, C. C. ....       | Westbourne Park ..  | (103) 188                                   | (104) *                 | (106) *                 | 188     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (106) 170                                   | (107) 186               | (108) 220               | 576     |
| Manuel, T. C. ....       | Myrtle Bank .....   | (109) 168                                   | (110) 247               | (111) *                 | 415     |
| Harris, W. A. ....       | Edwardstown .....   | (112) 230                                   | (113) 204               | (114) *                 | 434     |
| Harris, W. A. ....       | Edwardstown .....   | (115) 201                                   | (116) 185               | (117) 175               | 561     |
| Hill, W. ....            | Knoxville .....     | (118) 197                                   | (119) 217               | (120) 203               | 617     |
| Hill, W. ....            | Knoxville .....     | (121) 209                                   | (122) 207               | (123) 204               | 620     |
| McFarlane, A. S. ....    | Kilkenny .....      | (124) 178                                   | (125) *                 | (126) 138               | 316     |
| Hutchinson, A. S. ....   | Athelstone .....    | (127) *                                     | (128) 222               | (129) 209               | 431     |
| Hutchinson, A. S. ....   | Athelstone .....    | (130) 43                                    | (131) 201               | (132) 193               | 437     |
| Gavin, C. G. ....        | Salisbury .....     | (133) 210                                   | (134) 215               | (135) 245               | 670     |
| Gavin, C. G. ....        | Salisbury .....     | (136) 232                                   | (137) 225               | (138) 213               | 670     |
| Thomas, C. R. ....       | Hectorville .....   | (139) 206                                   | (140) 201               | (141) 155               | 562     |



*Egg Laying Competition.—Section 1.—White Leghorns, etc.—continued.*

| Competitors.            | Address.           | Score for Month ending February<br>28th, 1931. |                               |                               |         |
|-------------------------|--------------------|------------------------------------------------|-------------------------------|-------------------------------|---------|
|                         |                    | Bird No.<br>and Eggs<br>Laid.                  | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Compton, R. C. ....     | Woodeforde ....    | (142) 174                                      | (143) 205                     | (144) 201                     | 580     |
| Connor, D. C. ....      | Gawler ....        | (145) 107                                      | (146) †                       | (147) 152                     | 259     |
| Robinson, A. E. ....    | Hectorville ....   | (148) 253                                      | (149) †                       | (150) 227                     | 480     |
| Vann, R. S. ....        | New Hindmarsh ...  | (151) 176                                      | (152) 166                     | (153) 137                     | 479     |
| McLean, J. G. ....      | Black Forest ....  | (154) 138                                      | (155) 153                     | (156) 141                     | 432     |
| Fidge, H. ....          | Clarence Park .... | (157) 171                                      | (158) 171                     | (159) *                       | 342     |
| Fidge, H. ....          | Clarence Park .... | (160) 154                                      | (161) 183                     | (162) 211                     | 548     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (163) 155                                      | (164) 148                     | (165) *                       | 303     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (166) 154                                      | (167) 171                     | (168) 138                     | 463     |
| Monkhouse, A. J. ....   | Woodside ....      | (169) 171                                      | (170) 217                     | (171) *                       | 388     |
| Monkhouse, A. J. ....   | Woodside ....      | (172) *                                        | (173) *                       | (174) 208                     | 208     |
| Monkhouse, A. J. ....   | Woodside ....      | (175) 208                                      | (176) *                       | (177) *                       | 208     |
| Monkhouse, A. J. ....   | Woodside ....      | (178) *                                        | (179) *                       | (180) 167                     | 167     |
| Sage, H. R. ....        | Nuricootpa ....    | (181) 147                                      | (182) *                       | (183) 179                     | 326     |
| Mitchell, W. J. ....    | Woodside ....      | (184) 217                                      | (185) *                       | (186) 239                     | 456     |
| George, L. E. ....      | Redfern ....       | (187) 189                                      | (188) 233                     | (189) 164                     | 566     |
| George, L. E. ....      | Redfern ....       | (190) 221                                      | (191) 212                     | (192) *                       | 433     |
| George, L. E. ....      | Redfern ....       | (193) 167                                      | (194) 204                     | (195) 206                     | 577     |
| George, L. E. ....      | Redfern ....       | (196) 189                                      | (197) 221                     | (198) 219                     | 629     |
| Aird, J. R., & Son .... | Kilkenny ....      | (199) 186                                      | (200) 219                     | (201) *                       | 405     |
| Aird, J. R., & Son .... | Kilkenny ....      | (202) 174                                      | (203) 184                     | (204) 177                     | 535     |
| Gameau, V. F. ....      | Woodville ....     | (205) 179                                      | (206) 163                     | (207) 184                     | 526     |
| Totals.....             | .....              | 11,022                                         | 10,344                        | 9,721                         | 31,087  |

*Section 3.—Black Orpingtons.*

| Competitors.            | Address.           | Score for Month ending February<br>28th, 1931. |                               |                               |         |
|-------------------------|--------------------|------------------------------------------------|-------------------------------|-------------------------------|---------|
|                         |                    | Bird No.<br>and Eggs<br>Laid.                  | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Aird, J. R., & Son .... | Kilkenny ....      | (208) 155                                      | (209) 106                     | (210) 179                     | 440     |
| Aird, J. R., & Son .... | Kilkenny ....      | (211) 145                                      | (212) 167                     | (213) *                       | 312     |
| Williams, W. R. ....    | Frewville ....     | (214) 187                                      | (215) 220                     | (216) 186                     | 593     |
| Williams, W. R. ....    | Frewville ....     | (217) †                                        | (218) *                       | (219) 179                     | 179     |
| Gurr, A. and H. ....    | Scott's Creek .... | (220) *                                        | (221) *                       | (222) *                       | —       |
| Andrewartha, A. ....    | Underdale ....     | (223) *                                        | (224) 196                     | (225) 215                     | 411     |
| McFarlane, A. S. ....   | Kilkenny ....      | (226) 212                                      | (227) 177                     | (228) 156                     | 545     |
| Connor, D. C. ....      | Gawler ....        | (229) *                                        | (230) 193                     | (231) *                       | 193     |
| Gillick, W. J. ....     | New Hindmarsh ...  | (232) 101                                      | (233) *                       | (234) *                       | 101     |
| Osborn, E. L. ....      | Camden.....        | (235) 150                                      | (236) 223                     | (237) 196                     | 569     |
| Totals.....             | .....              | 950                                            | 1,282                         | 1,111                         | 3,343   |

*Section 4.—Rhode Island Reds.*

| Competitors.       | Address.           | Score for Month ending February<br>28th, 1931. |                               |                               |         |
|--------------------|--------------------|------------------------------------------------|-------------------------------|-------------------------------|---------|
|                    |                    | Bird No.<br>and Eggs<br>Laid.                  | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Gameau, V. F. .... | Woodville ....     | (238) 141                                      | (239) 180                     | (240) 122                     | 443     |
| Fidge, H. ....     | Clarence Park .... | (241) 179                                      | (242) 213                     | (243) 96                      | 488     |
| Totals.....        | .....              | 320                                            | 393                           | 218                           | 931     |

\* Disqualified, Rule 12, underweight eggs.

† Dead.



## THE HILLS HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         |                          | Butterfat.               |                         |                          | Average Test. |
|----------|------------------------------|------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during January. | Per Cow during January. | Per Cow July to January. | Per Herd during January. | Per Cow during January. | Per Cow July to January. |               |
|          |                              |                              | Lbs.                     | Lbs.                    | Lbs.                     | Lbs.                     | Lbs.                    | Lbs.                     | %             |
| 7/D ...  | 25-65                        | 20-84                        | 14,135                   | 551-07                  | 4,695-61                 | 600-50                   | 23-41                   | 198-01                   | 4-25          |
| 7/E ...  | 25-71                        | 23-84                        | 16,610                   | 646-37                  | 5,077-75                 | 689-58                   | 26-83                   | 210-54                   | 4-16          |
| 7/H ...  | 8                            | 7                            | 4,541                    | 567-69                  | 5,121-98                 | 217-87                   | 27-23                   | 240-85                   | 4-80          |
| 7/J ...  | 18                           | 15-39                        | 11,091                   | 616-17                  | 4,338-88                 | 518-04                   | 28-78                   | 204-02                   | 4-67          |
| 7/K ...  | 18                           | 17-45                        | 13,670                   | 759-44                  | 5,588-83                 | 586-26                   | 32-57                   | 240-81                   | 4-29          |
| 7/L ...  | 35-97                        | 33-97                        | 17,960                   | 499-04                  | 3,698-07                 | 855-56                   | 23-79                   | 174-02                   | 4-77          |
| 7/O ...  | 21                           | 16-90                        | 8,362                    | 398-21                  | 3,259-75                 | 390-61                   | 18-60                   | 156-10                   | 4-67          |
| 7/S ...  | 14                           | 13-26                        | 5,838                    | 417-03                  | 4,699-00                 | 311-09                   | 22-22                   | 249-28                   | 5-33          |
| 7/T ...  | 11                           | 7                            | 3,332                    | 302-95                  | 4,029-55                 | 142-24                   | 12-98                   | 168-94                   | 4-27          |
| 7/V ...  | 9                            | 8                            | 6,696                    | 744-00                  | 2,929-94                 | 321-62                   | 35-74                   | 138-02                   | 4-80          |
| 7/W ...  | 21                           | 19-26                        | 13,416                   | 638-88                  | 4,853-32                 | 613-06                   | 29-19                   | 219-01                   | 4-57          |
| 7/X ...  | 16                           | 14-23                        | 7,585                    | 474-09                  | 5,099-78                 | 338-85                   | 21-18                   | 215-53                   | 4-47          |
| 7/Y ...  | 21                           | 16-97                        | 10,018                   | 477-07                  | 3,455-02                 | 483-19                   | 23-01                   | 165-06                   | 4-82          |
| 7/Z ...  | 10-42                        | 4-52                         | 4,458                    | 427-87                  | 2,818-82                 | 182-79                   | 17-54                   | 126-25                   | 4-10          |
| 7/AA ... | 8                            | 6-23                         | 4,168                    | 521-06                  | 3,414-69                 | 204-88                   | 25-61                   | 171-91                   | 4-91          |
| 7/BB ... | 15                           | 11-90                        | 9,904                    | 664-30                  | 4,245-53                 | 424-98                   | 28-33                   | 174-28                   | 4-26          |
| 7/DD ... | 12                           | 8-84                         | 6,216                    | 518-04                  | 4,646-03                 | 307-35                   | 25-61                   | 228-83                   | 4-94          |
| 7/EE ... | 26-26                        | 21-74                        | 9,958                    | 379-21                  | 3,245-40                 | 418-80                   | 15-95                   | 137-48                   | 4-21          |
| 7/GG ... | 14                           | 14                           | 6,386                    | 456-14                  | 3,425-88                 | 311-52                   | 22-25                   | 175-09                   | 4-88          |
| 7/HH ... | 17                           | 14-58                        | 7,144                    | 420-23                  | 3,789-31                 | 319-99                   | 18-82                   | 164-92                   | 4-48          |
| 7/II ... | 13                           | 12-45                        | 5,464                    | 420-31                  | 3,498-22                 | 256-71                   | 19-75                   | 165-53                   | 4-70          |
| 7/JJ ... | 19                           | 18                           | 13,872                   | 730-13                  | —                        | 598-90                   | 31-52                   | —                        | 4-32          |
| Means    | 17-23                        | 14-84                        | 9,130-93                 | 530-01                  | 4,228-13                 | 413-38                   | 23-99                   | 190-52                   | 4-53          |

\* Commenced August.

## NARRUNG HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         |                             | Butterfat.               |                         |                             | Average Test. |
|----------|------------------------------|------------------------------|--------------------------|-------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---------------|
|          |                              |                              | Per Herd during January. | Per Cow during January. | Per Cow October to January. | Per Herd during January. | Per Cow during January. | Per Cow October to January. |               |
|          |                              |                              | Lbs.                     | Lbs.                    | Lbs.                        | Lbs.                     | Lbs.                    | Lbs.                        | %             |
| 5/C ...  | 30                           | 27-77                        | 15,261                   | 508-71                  | 2,232-05                    | 730-14                   | 24-34                   | 106-46                      | 4-77          |
| 5/D ...  | 29-13                        | 24-94                        | 11,677                   | 400-85                  | 2,098-13                    | 650-73                   | 22-34                   | 110-76                      | 5-57          |
| 5/E ...  | 35-10                        | 29-42                        | 14,201                   | 404-58                  | 2,045-07                    | 755-25                   | 21-52                   | 105-03                      | 5-32          |
| 5/F ...  | 25                           | 21-61                        | 7,406                    | 296-26                  | 1,723-46                    | 390-53                   | 15-62                   | 93-46                       | 5-27          |
| 5/G ...  | 25                           | 24-48                        | 13,268                   | 530-72                  | 2,726-59                    | 686-12                   | 27-44                   | 142-62                      | 5-17          |
| 5/H ...  | 53-48                        | 46-42                        | 16,797                   | 314-09                  | 1,715-86                    | 692-20                   | 12-94                   | 72-99                       | 4-12          |
| 5/I ...  | 30                           | 23-10                        | 6,589                    | 219-65                  | 1,896-99                    | 356-16                   | 11-87                   | 94-87                       | 5-40          |
| 5/J ...  | 21-61                        | 19-97                        | 11,199                   | 518-25                  | 2,427-93                    | 484-13                   | 22-50                   | 107-35                      | 4-34          |
| 5/U ...  | 20-74                        | 14-55                        | 13,883                   | 669-38                  | 2,858-51                    | 555-50                   | 26-78                   | 123-94                      | 4-00          |
| 5/Y ...  | 26-06                        | 25-55                        | 17,975                   | 689-77                  | 2,655-95                    | 922-63                   | 35-41                   | 137-09                      | 5-13          |
| 5/Z ...  | 29                           | 22-39                        | 16,440                   | 566-91                  | 3,283-47                    | 769-62                   | 26-54                   | 155-52                      | 4-68          |
| 5/AA ... | 18                           | 16-55                        | 9,957                    | 553-19                  | 1,762-30                    | 470-38                   | 26-13                   | 98-48                       | 4-72          |
| 5/CC ... | 34                           | 18-32                        | 5,171                    | 152-10                  | 1,524-75                    | 217-97                   | 6-41                    | 67-43                       | 4-21          |
| 5/DD ... | 21-87                        | 18-05                        | 10,317                   | 471-74                  | 2,202-85                    | 520-15                   | 23-78                   | 113-14                      | 5-04          |
| 5/EE ... | 15                           | 15                           | 9,672                    | 644-80                  | 2,665-78                    | 460-15                   | 30-68                   | 126-66                      | 4-76          |
| 5/II ... | 27                           | 23-84                        | 14,542                   | 538-59                  | 2,970-75                    | 745-93                   | 27-68                   | 138-35                      | 5-13          |
| 5/JJ ... | 27                           | 18-39                        | 10,147                   | 375-81                  | 2,575-16                    | 454-95                   | 16-85                   | 117-57                      | 4-48          |
| 5/KK ... | 23                           | 19-87                        | 12,719                   | 553-02                  | 2,044-94                    | 598-67                   | 25-81                   | 92-24                       | 4-67          |
| 5/MM ... | 14                           | 12-29                        | 7,284                    | 520-28                  | 2,310-36                    | 364-20                   | 26-01                   | 118-31                      | 5-00          |
| 5/NN ... | 28                           | 27-10                        | 16,064                   | 573-7                   | 2,507-14                    | 693-69                   | 24-77                   | 109-81                      | 4-32          |
| 5/OO ... | 23                           | 20-19                        | 12,274                   | 533-67                  | 2,422-09                    | 498-77                   | 21-69                   | 109-77                      | 4-06          |
| Means    | 26-48                        | 22-40                        | 12,040-29                | 454-77                  | 2,272-85                    | 572-13                   | 21-61                   | 108-61                      | 4-75          |



# LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                    |                         |                              | Butterfat.               |                         |                              | Average Test. |
|----------|------------------------------|------------------------------|--------------------------|-------------------------|------------------------------|--------------------------|-------------------------|------------------------------|---------------|
|          |                              |                              | Per Herd during January. | Per Cow during January. | Per Cow December to January. | Per Herd during January. | Per Cow during January. | Per Cow December to January. |               |
|          |                              |                              | Lbs.                     | Lbs.                    | Lbs.                         | Lbs.                     | Lbs.                    | Lbs.                         | %             |
| 6/B ...  | 20                           | 18-26                        | 6,502                    | 325-10                  | 814-13                       | 286-62                   | 14-33                   | 35-34                        | 4-41          |
| 6/C ...  | 18                           | 17-68                        | 7,737                    | 429-83                  | 946-50                       | 323-42                   | 17-07                   | 39-79                        | 4-18          |
| 6/F ...  | 24                           | 22-52                        | 13,582                   | 565-92                  | 1,254-34                     | 600-95                   | 25-04                   | 56-01                        | 4-42          |
| 6/H ...  | 20                           | 19-55                        | 10,084                   | 548-88                  | 1,007-95                     | 453-80                   | 24-57                   | 43-89                        | 4-50          |
| 6/O ...  | 18-06                        | 17-90                        | 10,299                   | 570-26                  | 1,184-18                     | 486-87                   | 26-90                   | 56-23                        | 4-72          |
| 6/R ...  | 22                           | 16                           | 4,198                    | 190-82                  | 431-00                       | 239-57                   | 10-89                   | 26-23                        | 5-71          |
| 6/U ...  | 19-10                        | 16-10                        | 9,171                    | 479-29                  | 862-77                       | 359-83                   | 18-80                   | 33-84                        | 4-02          |
| 6/W ...  | 25                           | 21-13                        | 14,528                   | 581-14                  | 1,096-76                     | 679-38                   | 27-18                   | 51-03                        | 4-68          |
| 6/Y ...  | 15                           | 11-03                        | 6,425                    | 428-37                  | 1,047-34                     | 256-76                   | 17-12                   | 41-96                        | 4-00          |
| 6/E ...  | 48                           | 38-84                        | 26,331                   | 548-81                  | 1,060-57                     | 1,090-92                 | 22-73                   | 44-83                        | 4-15          |
| 6/I ...  | 33-84                        | 31-97                        | 22,321                   | 659-60                  | 1,446-81                     | 966-83                   | 28-57                   | 61-90                        | 4-33          |
| 6/L ...  | 27                           | 19-42                        | 15,791                   | 584-87                  | 1,212-71                     | 693-04                   | 25-67                   | 52-19                        | 4-39          |
| 6/LL ... | 22-16                        | 19-68                        | 15,385                   | 694-26                  | 1,358-60                     | 666-14                   | 30-06                   | 58-40                        | 4-33          |
| 6/MM ... | 16                           | 18-74                        | 7,055                    | 441-07                  | 790-34                       | 357-92                   | 22-38                   | 38-77                        | 5-07          |
| 6/OO ... | 17-77                        | 12-61                        | 12,023                   | 676-55                  | 1,206-80                     | 547-87                   | 30-83                   | 54-79                        | 4-55          |
| 6/PP ... | 20                           | 17-81                        | 13,811                   | 690-58                  | 1,298-76                     | 645-84                   | 32-29                   | 59-40                        | 4-68          |
| 6/QQ ... | 26-74                        | 24-84                        | 21,384                   | 799-72                  | 1,627-07                     | 909-91                   | 34-03                   | 68-24                        | 4-25          |
| 6/RR ... | 25-74                        | 23-90                        | 18,032                   | 700-56                  | 1,544-02                     | 781-96                   | 30-38                   | 65-01                        | 4-34          |
| 6/SS ... | 26-03                        | 26-03                        | 25,041                   | 962-02                  | 2,012-87                     | 1,023-12                 | 39-31                   | 80-75                        | 4-09          |
| 6/TT ... | 20                           | 17-35                        | 10,306                   | 515-30                  | 1,022-24                     | 462-79                   | 23-14                   | 45-26                        | 4-49          |
| 6/UV ... | 38-26                        | 37-06                        | 21,258                   | 555-63                  | 1,130-57                     | 900-09                   | 23-53                   | 47-72                        | 4-24          |
| 6/VV ... | 20                           | 19                           | 17,127                   | 856-38                  | —                            | 798-60                   | 39-93                   | —                            | 4-66          |
| Means .  | 23-76                        | 21-02                        | 14,018-02                | 590-01                  | 1,193-40                     | 615-06                   | 25-89                   | 51-85                        | 4-39          |

# GRUBBING

## IS A ONE MAN JOB

FOR STUMPS LARGE OR SMALL, GREEN OR DRY, SHORT OR HEAD-HIGH. THE ENORMOUS POWER OF A

## MONKEY GRUBBER

### EASILY ACCOMPLISHES THE TASK

Removing the most stubborn obstacles cleanly, with most roots intact. Easy to handle, simple to operate, expeditious—its only need, regular oiling. The Standard equipment will clean up everything over 1½ acres from one anchorage.

Each part designed for simplicity, easy handling, and long trouble-free service.

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## ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR MARCH.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

Packing apples and pears for export or for storage will be the principal work of the month; unfortunately, there will be but little for export as compared with last year, but the same need of care is here. Fruit which has not begun to mature will not store or carry well, and damaged fruit will get worse and ruin the sample.

Drying of grape fruits will continue; growers must resist the tendency to pick too soon; matured fruits are necessary to make good dried produce.

If it is intended to extend the orchard or vineyard, or to plant a new one, the soil should be kept in good order, free of weeds, and finely cultivated. For trees it is a good practice to open up the holes early, and stakes can be put into position. Order at once from the nurseryman so as to be sure of getting the varieties required.

Citrus trees may be planted this month; be sure and have all trees fumigated before being sent on; it is very easy to introduce pests into the orchard, but it is very difficult to control them afterwards.

Fumigation for scale insects should be proceeded with at once. It is the best method we have so far for controlling these pests, but it is not by any means a perfect process, as many insects have a means of resistance. Where it is not practicable to fumigate, the use of white oil sprays is advised—Volck and Alboleum do good work if used thoroughly; do not use any spray on hot, sunny days.

As a preventive of "brown rot," limbs of citrus should be kept up from ground.

Almond gathering will be in full swing, and care should be taken to keep the varieties separate; mixed lots bring lower prices. Cracking by hand is a tedious process, but several machines are under trial, and later on some simple machine may be obtainable which will do the work expeditiously and with little damage to the kernels. Hardshells should pay to crack, and mostly they have the small kernels which are required by the manufacturers.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### CONFERENCE AT LYNDCH.

The first of the 1931 series of Conferences of the Agricultural Bureau was held on February 26th, when Branches in the Lower North district met at Lyndoch. The Department of Agriculture was represented by Messrs. F. Coleman (Chairman), A. M. Dawkins (member Advisory Board of Agriculture), Prof. Arthur J. Perkins (Director of Agriculture), G. Quinn (Chief Horticultural Instructor), H. B. Barlow (Chief Dairy Instructor), A. H. Robin, B.V.Sc. (Government Veterinary Officer), R. C. Scott (Superintendent Experimental Work), C. F. Anderson (Government Poultry Expert), W. C. Johnston and J. B. Harris (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

There was an excellent attendance of delegates from the Rosedale, Williamstown, Lyndoch, Light's Pass, Roseworthy, Lone Pine, Wasleys, Saddleworth, Gawler River, Greenock, Wirrilla, Clare, and Truro Branches. A feature of the Conference was the



excellent exhibit of farm produce, which included fresh, preserved, and dried fruits, cereals, hay, ensilage, vegetables, and cut flowers staged by the members of the Williamstown and Lyndoch Branches. Mr. A. Springbett (Lyndoch) presided and the opening address was delivered by Mr. F. Coleman.

During the course of the Conference, officers of the Department replied to a large number of questions, and the following papers were read and discussed:—"Haymaking," Mr. R. Nietschke (Truro); "Sheep and Wool," Mr. W. Scott (Truro); "Mixed Farming," Mr. G. Buckby (Wasleys). It was decided that the 1932 Conference should be held at Owen. Mr. A. M. Dawkins presented the trophies to the successful competitors in the district crop competitions:—Midlands—First, B. J. Clift; second, A. G. Blyth; third, A. J. Melrose; fourth, G. M. Frost. Central—First, T. W. Roenfeldt; second, A. J. Siedel; and best crop entered by a member of the Wasleys Branch, W. K. Oliver.

During the evening session Mr. F. Coleman addressed the Conference on the subject, "A Phase of the Farmers' Problems," and Mr. C. F. Anderson spoke on "The Housing and Feeding of Poultry."

Special sessions were held for the delegates from Women's Branches. Mrs. J. Hammatt (Williamstown) presided. There was a very good attendance of delegates, and the following papers were read:—"Butter Making," Mrs. A. Nottle (Wasleys); "Dried Fruit," Miss L. Dennison (Auburn); "Gelatine," Mrs. S. Schunke (Wirrilla); "A Chaff, Hay, or Fuelless Cooker," Mrs. M. Wild (Williamstown); "Fancy Work," Miss G. George (Wasleys). Miss E. Campbell, Dip. Dom. Econ., of the Education Department, gave an instructive address, "The Use of Hessian in the Home."

### **METTER'S "NUOIL" DOUBLE GEARED SELF-OILING WINDMILLS.**

**IN SIZES FROM 6ft. TO 14ft. WHEEL.**



The strongest, best lubricated, best designed, and best governed.  
Pump more water on a lighter boom.

No spring or automatic oiling system to break, and no sheet-metal oil conveyors to wear out.

Gained First Prize and Silver Medal Adelaide Show, 1922, 1923, 1924, 1925, 1926, and 1929 (no entry 1928-29).

Also Gold Medal at the All-Australian Exhibition, 1920.

A reliable and useful investment, and the popular choice of experienced pastoralists, farmers, and others.

#### **METTER'S 5ft. "MINOR" WINDMILLS.**

Most efficient for pumping water from shallow depths.

**MILL ONLY, 29 15/0; on 15ft. G.I. TOWER, £15 15/0; on 20ft. TOWER, £17 17/6.**

#### **METTER'S FUEL STOVES and WASHING COPPERS.**

Use less fuel and retain heat longer.

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ADELAIDE.**

**"NO FEAR OF A DROUGHT WITH A  
METTERS ABOUT."**



## ADVISORY BOARD OF AGRICULTURE.

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The monthly meeting of the Advisory Board of Agriculture was held at the Blackwood Experimental Orchard on February 25th, there being present:—Messrs. F. Coleman (Chairman), H. N. Wicks (Vice-Chairman), G. Jeffrey, A. M. Dawkins, P. H. Jones, S. Shepherd, A. J. Cooke, A. L. McEwin, P. J. Baily, Dr. A. E. V. Richardson (Director Waite Research Institute), G. Quinn (Government Horticultural Instructor), R. Fowler (Manager Blackwood Orchard), and H. C. Pritchard (Secretary). Apologies were received from Messrs. R. H. Martin, J. W. Sandford, H. S. Taylor, Prof. A. J. Perkins, and Mr. W. R. Birks.

*Agents' Commission on Superphosphate.*—A communication was received from the secretary of the Superphosphate Association following an interview with a committee appointed by the Board to interview the association with regard to commission paid to agents for orders for superphosphates. In the course of his reply, the secretary to the association states that the manufacturers for many years have sold their products through the intervention of certain distributing firms, two of whom were so dissatisfied with their experience of this particular business that they have withdrawn entirely from this trade; it did not pay them to continue, even at the rate of commission which has been suggested as excessive. The selling price has always been based on an all-round figure averaged to provide for the credit which has had to be given, and if, as suggested by the Advisory Board, it were possible for certain farmers, i.e., the more affluent ones, to deal direct for cash, the effect would be that the remainder, who were in a less flourishing condition, would have to pay more to bring out the average, for the net return to the manufacturer is not capable of reduction, being based upon a figure that barely gives an adequate return to the shareholder. If all the affluent farmers came direct, that would leave all the poorer "marks" to be carried by the distributors, who naturally would need a higher commission to compensate for this risk. Much has been said about the unnecessary employment of agents, who are paid 2s. 6d. per ton for his services. An agent's duties consist in soliciting orders, advising his principals upon the financial standing of the client, endeavoring to aggregate orders to make up full truck loads, keeping an eye on consignments which arrive and may require sheeting, &c., after arrival, and helping in collection of accounts. That is quite a sheaf of duties, and it is a fact that in the Victorian instance, where the services of an agent are not provided, the customer frequently is in such a quandary that were it not for the good offices of an agent of one of the other manufacturers who, without remuneration (but possibly in the hope of benefits to come), saves the customer from expense such as demurrage, unloading trucks, &c., such farmer would be at considerable financial loss. It would be impossible to reduce the price of superphosphate by the elimination of the distributors, for if that were done, the price would have to be increased to compensate for the extra financial burden.

Members expressed their appreciation of the work performed by the committee in this matter.

*Leave of Absence.*—Mr. J. W. Sandford, who has been appointed by the Government as a member of a committee to inquire into education in South Australia, applied for leave of absence from the Board until such time as his duties with this committee expired. The Secretary was instructed to request the Minister to grant such leave of absence to Mr. Sandford.

*Life Membership.*—Life membership of the Agricultural Bureau was conferred upon Messrs. G. A. Bennett and W. J. Hemming of the Kalangadoo Branch. The Kalangadoo Branch also made application for Mr. N. McCall to be made a life member. In this case, however, office records showed that Mr. McCall had only been associated with the Bureau for 17 years. The Secretary was given authority to issue the certificate pro-



vided that the Branch could first of all furnish additional information showing that Mr. McCall had 20 years' membership to his credit.

*New Members.*—The following names were added to the rolls of existing Branches:—Springton—B. H. Greatz; Monarto South—E. H. Thiele, T. Peake; Wepowie—J. M. Jasper; Caltowie—J. H. Woolcock, G. Amey, — Neindorf, — Neindorf (Bros.), J. Doody, A. Crossman; Millicent—H. C. Godson; Paskeville—C. Lee, E. A. W. Zimmermann, H. C. J. Daniel; Auburn Women's—Miss B. Dennison; Warcowie Women's—Miss M. M. Sweet, Mrs. A. G. Avery, Mrs. E. A. Wheadon; Bowhill—A. Loechel; Caltowie—A. Travers; Parilla—S. A. Leane; Wolseley—W. D. M. Starick; Hartley—H. C. Brook, R. H. Cross; Virginia—John Bowman; Goode Women's—Miss Hilda Linke, Miss D. Tucker; Wirrabara—A. J. Watt, G. Kranz, W. Freeman, E. A. W. Harding; Wandearah—E. H. O'Shaughnessy. Number of new members for approval, 32; number of members on January 28th, 1931, 8,426; number of Branches, 305.



**Buy your Vegetables  
with your Groceries  
in packets!**

WHEN next you make up your list of provisions to be bought, add to it Swallow & Ariell's Compressed Vegetables. They are easily prepared—economical—with the true vegetable flavour. Though only water is removed from them they have but a tenth the weight of fresh vegetables. Compressed Vegetables are easily carried, and as easily stored.

Carrots, Parsnips, Turnips, Onions, and mixed—in 1/2-lb. cartons and 1-lb. tins. Tomatoes and Rhubarb—in 1/2-lb. cartons. Beetroot—Loose, in 1-lb. tins. Mixed Vegetables—Loose, in 1 1/2-oz. packets.

Ask your Storekeeper for:

**Swallow & Ariell's  
COMPRESSED  
VEGETABLES**



## DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported:—

**BUTTER.**—The demand for all grades of butter has kept up fairly well considering the times, and so far production in this State has been almost sufficient for all requirements. The quantities are now falling back, however, so that it will be necessary to import increased supplies from the eastern States from this out. Owing to the exchange position, the buyers for London have not been operating quite so freely throughout Australia and f.o.b. values have weakened. The present prices are as follows:—Choicest creamery fresh butter, in bulk, 1s. 7½d.; prints and delivery extra; second and third grades, 1s. 5½d. (These prices are subject to the stabilisation levies). Best separators, 1s. 3½d. to 1s. 4½d.; well conditioned store and collectors', 1s. to 1s. 1d.; heated and pastry, 11d. per lb.

**EGGS.**—As usual at this time of the year, eggs are declining each week, but farmers are retaining the laying hens more so than usual so as to obtain an earning from the eggs produced, and production is therefore keeping up better than it did last year. Values hardened towards the latter end of February, but with Sydney and Melbourne markets weaker, it is preventing rates here moving higher for the time being. Ordinary country eggs, 7½d. per dozen; duck, 8½d. per dozen; selected, tested, and infertile, higher.

**CHEESE.**—The supplies of milk to the cheese factories are now considerably reduced, and therefore the production of cheese is declining each week. With the higher prices ruling for butter, cheese firmed in sympathy, and rates at present are:—New makes, large to loaf, 8½d. to 8½d. per lb.; semi-matured and matured, 11d. to 1s. per lb.

**ALMONDS.**—Values for the time being are only nominal, and there are very few inquiries for parcel lots at present, and only just odd bags are selling from day to day. There are increasing quantities arriving each week of the new crop, and large buyers are holding off because of the almonds not being thoroughly dried, and there is always at this time of the year a considerable shrinkage in weight. Brandis, 7d. to 7½d.; mixed softshells, 6½d. to 6½d.; hardshells, 4d. to 4½d.; kernels, 1s. 6½d. to 1s. 7d. per lb.

**HONEY.**—Although the "take" this year seems likely to be a short one, there are ample stocks held from the previous season, and trade is only moderate for prime clear extracted lines, whilst lower grades are neglected. Prime clear extracted, in liquid condition, 3½d. to 3½d. per lb.; best quality candied lots, 2½d. to 3½d.; second grade, 1½d. to 2d. per lb.

**BEESWAX.**—Moderate supplies; demand fair; 1s. 4d. to 1s. 4½d. per lb., according to quality.

**BACON.**—The demand for bacon is fairly good, but until the winter season comes in the turnover will not improve to any great extent. Supplies marketed were ample for all requirements. Best local sides, 9½d. to 10d.; best local factory cured middles, 8½d. to 9d.; large, 7½d.; local rolls, 8½d. to 9d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 2d.; local hams, 1s. to 1s. 1d.; cooked, 1s. 3d.; "Sugar Cane" brand lard, in packets, 11d.; in bulk, 10d. per lb.; local prints, 9d. per lb.

**LIVE POULTRY.**—The demand for live poultry has kept up well throughout the month, and supplies marketed, although fairly extensive, have met with ready clearances. The majority of the birds being marketed are only of the lighter breeds, and the small numbers of turkeys sent in have been poor to medium in condition only. Prime roosters, 4s. to 5s. 3d.; nice conditioned cockerels, 3s. to 3s. 9d.; fair conditioned cockerels, 2s. to 2s. 11d.; chickens, lower; heavy weight hens, 3s. 4d. to 4s. 3d.; medium hens, 2s. 4d. to 3s. 3d.; light hens, 1s. 8d. to 2s. 3d.; couple of pens of weedy sorts, lower; geese, 3s. 6d. to 5s.; prime young Muscovy drakes, 3s. 6d. to 4s. 6d.; ducks, good conditioned, 2s. 6d. to 3s. 4d.; ducks, fair condition, 1s. 6d. to 2s. 3d.; ducklings, lower; turkeys, good to prime condition, 11d. to 1s. 3d. per lb. live weight; turkeys, fair condition, 8d. to 10d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 5d. each.

**POTATOES.**—New local potatoes, 5s. 6d. to 6s. per cwt.

**ONIONS.**—New white or brown, 6s. to 7s. 6d. per cwt.



IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.,  
JANUARY, 1931.

IMPORTS.

Interstate.

|                                    |        |
|------------------------------------|--------|
| Apples (bushels) .. . . .          | 16     |
| Bananas (bushels) .. . . .         | 10,723 |
| Citrus—                            |        |
| Lemons (bushels) .. . . .          | 104    |
| Oranges (bushels) .. . . .         | 11     |
| Passion fruit (bushels) .. . . .   | 49½    |
| Peaches (bushels) .. . . .         | 11     |
| Pears (bushels) .. . . .           | 2      |
| Pineapples bushels) .. . . .       | 648    |
| Tomatoes (bushels) .. . . .        | 75     |
| Currants, black (bushels) .. . . . | 19½    |
| Peanuts (bags) .. . . .            | 97     |
| Peanuts, kernels (bags) .. . . .   | 10     |
| Cucumbers (bushels) .. . . .       | 2      |
| Bulbs (packages) .. . . .          | 33     |
| Plants (packages) .. . . .         | 18     |
| Seeds (packages) .. . . .          | 76     |
| Wine casks (number) .. . . .       | 2,239  |
| Fumigated—                         |        |
| Citrus—Lemons (bushels) .. . . .   | 36     |
| Wine casks (number) .. . . .       | 34     |
| Rejected—                          |        |
| Bananas (bushels) .. . . .         | 36     |
| Oranges (bushel) .. . . .          | 1      |

Overseas.

(State Law.)

|                              |     |
|------------------------------|-----|
| Wine casks (number) .. . . . | 760 |
|------------------------------|-----|

Federal Quarantine Act.

|                     | Packages. | Lbs.      |
|---------------------|-----------|-----------|
| Seeds, &c. .. . . . | 3,492     | 626,542   |
|                     |           | No.       |
| Canes .. . . .      | 20        | 20        |
| Rattans .. . . .    | 46        | 46        |
| Tea chests .. . . . | 250       | 250       |
|                     |           | Sup. ft.  |
| Timber .. . . .     | 60,477    | 1,959,988 |

EXPORTS.

Federal Commerce Act.

Packages.

|                                  |       |
|----------------------------------|-------|
| England—Pears .. . . .           | 2,284 |
| New Zealand—Mixed fruit .. . . . | 6     |
| Bulbs .. . . .                   | 3     |



Design No. 11.

FRAMED HOUSES

READY TO ERECT.

SEND FOR CATALOGUE.

TIMBER

FOR EVERY JOB.

TERMS ARRANGED.

**COWELL BROS. & COY. LTD.,**  
ADELAIDE, NORWOOD (Head Office), and PORT ADELAIDE.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of February, 1931, also the average precipitation to the end of February, and the average annual rainfall.

| Station.                          | For Feb. 1931. | To end Feb. | Av'ge to end Feb. | Av'ge Annual Rain-fall. | Station.                      | For Feb. 1931. | To end Feb. | Av'ge to end Feb. | Av'ge Annual Rain-fall. |
|-----------------------------------|----------------|-------------|-------------------|-------------------------|-------------------------------|----------------|-------------|-------------------|-------------------------|
| <b>FAR NORTH AND UPPER NORTH.</b> |                |             |                   |                         | <b>LOWER NORTH—continued.</b> |                |             |                   |                         |
| Oodnadatta .....                  | —              | —           | 1.19              | 4.72                    | Brinkworth ....               | 0.08           | 0.64        | 1.18              | 15.85                   |
| Marree .....                      | —              | 0.04        | 0.92              | 5.86                    | Blyth .....                   | 0.06           | 0.81        | 1.30              | 16.86                   |
| Farina .....                      | —              | 0.05        | 1.07              | 6.46                    | Clare .....                   | 0.07           | 0.76        | 1.69              | 24.61                   |
| Copley .....                      | —              | 0.03        | 1.12              | 7.93                    | Mintaro .....                 | 0.08           | 0.53        | 1.38              | 23.43                   |
| Beltana .....                     | —              | 0.04        | 1.35              | 8.59                    | Watervale .....               | 0.06           | 0.88        | 1.71              | 27.10                   |
| Blinman .....                     | —              | 0.07        | 1.69              | 12.02                   | Auburn .....                  | 0.04           | 0.47        | 1.81              | 24.08                   |
| Hookina .....                     | —              | 0.09        | 0.97              | 11.51                   | Hoyleton .....                | 0.13           | 0.35        | 1.29              | 17.44                   |
| Hawker .....                      | 0.04           | 0.14        | 1.16              | 12.28                   | Balaklava .....               | 0.07           | 0.58        | 1.25              | 15.61                   |
| Wilson .....                      | —              | 0.10        | 1.21              | 11.84                   | Port Wakefield ..             | 0.12           | 0.84        | 1.21              | 13.04                   |
| Gordon .....                      | 0.04           | 0.13        | 1.42              | 10.73                   | Terowie .....                 | 0.03           | 0.44        | 1.53              | 13.47                   |
| Quorn .....                       | 0.09           | 0.23        | 1.23              | 13.42                   | Yarcowie .....                | 0.01           | 0.43        | 1.40              | 13.72                   |
| Port Augusta ....                 | 0.24           | 0.35        | 1.02              | 9.43                    | Hallett .....                 | —              | 0.44        | 1.39              | 16.47                   |
| Bruce .....                       | 0.10           | 0.25        | 1.02              | 9.94                    | Mount Bryan ..                | —              | 0.21        | 1.36              | 16.79                   |
| Hammond .....                     | 0.09           | 0.29        | 1.22              | 11.41                   | Koorunga .....                | 0.03           | 0.38        | 1.44              | 17.96                   |
| Wilmington .....                  | 0.22           | 0.38        | 1.41              | 17.63                   | Farrell's Flat ..             | 0.13           | 0.48        | 1.39              | 18.75                   |
| Willowie .....                    | 0.09           | 0.19        | 1.20              | 12.11                   | <b>WEST OF MURRAY RANGE.</b>  |                |             |                   |                         |
| Melrose .....                     | 0.09           | 0.23        | 2.04              | 23.01                   | Manoora .....                 | 0.10           | 0.42        | 1.24              | 18.94                   |
| Booleroo Centre...                | 0.09           | 0.19        | 1.40              | 15.26                   | Saddleworth ....              | 0.04           | 0.46        | 1.47              | 19.60                   |
| Port Germein ....                 | 0.14           | 0.25        | 1.11              | 12.47                   | Marrabel .....                | 0.05           | 0.35        | 1.34              | 19.87                   |
| Wirrabara .....                   | —              | 0.25        | 1.36              | 19.34                   | Riverton .....                | 0.09           | 0.32        | 1.44              | 20.81                   |
| Appila .....                      | —              | 0.18        | 1.31              | 14.69                   | Tarlee .....                  | 0.18           | 0.38        | 1.41              | 18.13                   |
| Cradock .....                     | 0.03           | 0.08        | 1.26              | 10.87                   | Stockport .....               | 0.22           | 0.56        | 1.35              | 16.81                   |
| Carrieton .....                   | 0.08           | 0.16        | 1.36              | 12.40                   | Hamley Bridge ..              | 0.14           | 0.40        | 1.43              | 16.60                   |
| Johnburg .....                    | 0.07           | 0.14        | 1.15              | 10.64                   | Kapunda .....                 | 0.13           | 0.44        | 1.53              | 19.85                   |
| Eurelia .....                     | 0.03           | 0.12        | 1.43              | 13.06                   | Freeling .....                | 0.19           | 0.56        | 1.35              | 17.96                   |
| Orroroo .....                     | 0.08           | 0.21        | 1.63              | 13.28                   | Greenock .....                | 0.20           | 0.58        | 1.48              | 21.68                   |
| Nackara .....                     | 0.10           | 0.10        | 1.46              | 11.16                   | Truro .....                   | 0.07           | 0.82        | 1.41              | 20.09                   |
| Black Rock .....                  | 0.05           | 0.18        | 1.35              | 12.50                   | Stockwell .....               | 0.08           | 0.38        | 1.41              | 20.18                   |
| Oodlawirra .....                  | 0.04           | 0.17        | —                 | —                       | Nuriootpa .....               | 0.18           | 0.50        | 1.43              | 20.65                   |
| Peterborough ....                 | 0.06           | 0.37        | 1.44              | 13.30                   | Angaston .....                | 0.15           | 0.51        | 1.50              | 22.49                   |
| Yongala .....                     | 0.09           | 0.45        | 1.35              | 14.46                   | Tanunda .....                 | 0.20           | 0.65        | 1.50              | 22.12                   |
| <b>NORTH-EAST.</b>                |                |             |                   |                         | Lyndoch .....                 | 0.20           | 0.68        | 1.45              | 23.58                   |
| Yunta .....                       | —              | 0.33        | 1.24              | 8.46                    | Williamstown...               | 0.16           | 0.73        | 1.62              | 27.71                   |
| Waukarunga .....                  | —              | 0.05        | 1.03              | 8.06                    | <b>ADELAIDE PLAINS.</b>       |                |             |                   |                         |
| Mannahill .....                   | —              | —           | 1.37              | 8.31                    | Owen .....                    | 0.10           | 0.49        | 1.47              | 13.91                   |
| Cockburn .....                    | —              | 0.11        | 1.25              | 7.93                    | Mallala .....                 | 0.04           | 0.59        | 1.34              | 16.67                   |
| Broken Hill, N.S.W.               | —              | 0.05        | 1.58              | 9.61                    | Roseworthy ....               | 0.08           | 0.61        | 1.30              | 17.38                   |
| <b>LOWER NORTH.</b>               |                |             |                   |                         | Gawler .....                  | 0.14           | 0.74        | 1.42              | 19.06                   |
| Port Pirie .....                  | 0.11           | 0.15        | 1.14              | 13.25                   | Two Wells .....               | 0.06           | 0.72        | 1.21              | 15.81                   |
| Port Broughton ..                 | 0.11           | 0.28        | 1.13              | 14.02                   | Virginia .....                | 0.06           | 0.68        | 1.29              | 17.23                   |
| Bute .....                        | 0.06           | 0.20        | 1.09              | 15.48                   | Smithfield .....              | 0.23           | 0.78        | 1.29              | 17.51                   |
| Laura .....                       | 0.18           | 0.34        | 1.41              | 18.11                   | Salisbury .....               | 0.14           | 0.67        | 1.35              | 18.60                   |
| Caltowie .....                    | 0.08           | 0.26        | 1.39              | 16.85                   | Adelaide .....                | 0.30           | 0.94        | 1.45              | 21.12                   |
| Jamestown .....                   | 0.03           | 0.21        | 1.35              | 17.84                   | Glen Osmond ..                | 0.25           | 0.76        | 1.65              | 26.06                   |
| Gladstone .....                   | 0.16           | 0.29        | 1.28              | 16.40                   | Magill .....                  | 0.27           | 0.81        | 1.68              | 25.61                   |
| Crystal Brook ....                | 0.11           | 0.23        | 1.28              | 15.87                   | <b>MOUNT LOFTY RANGES.</b>    |                |             |                   |                         |
| Georgetown .....                  | 0.15           | 0.25        | 1.40              | 18.47                   | Teatree Gully ...             | 0.26           | 0.79        | 1.74              | 27.53                   |
| Narriby .....                     | 0.06           | 0.19        | 1.18              | 15.93                   | Stirling West ..              | 0.72           | 2.00        | 2.74              | 46.90                   |
| Redbill .....                     | 0.04           | 0.37        | 1.19              | 16.63                   | Uraidla .....                 | 0.46           | 1.42        | 2.46              | 44.11                   |
| Spalding .....                    | 0.20           | 0.38        | 1.43              | 19.34                   | Clarendon .....               | 0.36           | 0.95        | 1.98              | 32.91                   |
| Gulnare .....                     | 0.19           | 0.43        | 1.49              | 18.74                   | Morphett Vale ..              | 0.23           | 0.66        | 1.51              | 23.69                   |
| Yaaka .....                       | 0.05           | 0.31        | 1.25              | 15.35                   | Noarlunga .....               | 0.05           | 0.21        | 1.31              | 20.40                   |
| Koolunga .....                    | 0.14           | 0.54        | 1.24              | 15.52                   | Willunga .....                | 0.10           | 0.31        | 1.60              | 26.02                   |
| Snowtown .....                    | 0.05           | 0.51        | 1.13              | 15.70                   | Aldinga .....                 | 0.20           | 0.27        | 1.30              | 20.25                   |



## RAINFALL—continued.

| Station.                         | For Feb. 1931. | To end Feb. | Av'ge to end Feb. | Av'ge Annual Rain-fall. | Station.                             | For Feb. 1931. | To end Feb. | Av'ge to end Feb. | Av'ge Annual Rain-fall. |
|----------------------------------|----------------|-------------|-------------------|-------------------------|--------------------------------------|----------------|-------------|-------------------|-------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                |             |                   |                         | <b>WEST OF SPENCER'S GULF—contd.</b> |                |             |                   |                         |
| Myponga .....                    | 0-06           | 0-55        | 1-98              | 29-14                   | Rudall .....                         | 0-13           | 0-79        | 1-25              | 12-07                   |
| Normanville .....                | 0-03           | 0-19        | 1-22              | 20-73                   | Cleve .....                          | 0-01           | 1-35        | 1-16              | 14-61                   |
| Yankalilla .....                 | 0-05           | 0-18        | 1-36              | 22-95                   | Cowell .....                         | 0-01           | 0-33        | 1-05              | 11-16                   |
| Mount Pleasant .....             | 0-22           | 1-05        | 1-61              | 27-29                   | Miltalie .....                       | —              | 1-12        | 1-13              | 13-59                   |
| Birdwood .....                   | 0-16           | 0-85        | 1-75              | 29-28                   | Darke's Peak ..                      | —              | 0-55        | 1-38              | 14-98                   |
| Gumeracha .....                  | 0-44           | 1-17        | 1-90              | 33-45                   | Kimba .....                          | 0-04           | 0-12        | 1-35              | 11-50                   |
| Millbrook Reservoir              | 0-46           | 1-03        | 2-33              | 35-55                   |                                      |                |             |                   |                         |
| Tweedvale .....                  | 0-27           | 1-00        | 1-90              | 35-96                   |                                      |                |             |                   |                         |
| Woodside .....                   | 0-16           | 1-18        | 1-89              | 32-38                   |                                      |                |             |                   |                         |
| Ambleside .....                  | 0-33           | 1-43        | 1-98              | 35-02                   |                                      |                |             |                   |                         |
| Nairne .....                     | 0-20           | 1-58        | 1-86              | 28-22                   |                                      |                |             |                   |                         |
| Mount Barker .....               | 0-30           | 1-86        | 1-96              | 31-71                   |                                      |                |             |                   |                         |
| Echunga .....                    | 0-30           | 1-23        | 1-99              | 33-29                   |                                      |                |             |                   |                         |
| Macclesfield .....               | 0-29           | 2-23        | 1-80              | 30-62                   |                                      |                |             |                   |                         |
| Meadows .....                    | 0-27           | 1-35        | 2-04              | 36-34                   |                                      |                |             |                   |                         |
| Strathalbyn .....                | 0-22           | 1-24        | 1-44              | 19-43                   |                                      |                |             |                   |                         |
| <b>MURRAY FLATS AND VALLEY.</b>  |                |             |                   |                         | <b>YORKE PENINSULA.</b>              |                |             |                   |                         |
| Meningie .....                   | 0-13           | 0-40        | 1-24              | 18-46                   | Walleroo .....                       | 0-18           | 0-45        | 1-03              | 13-94                   |
| Milang .....                     | 0-08           | 0-59        | 1-21              | 15-05                   | Kadina .....                         | 0-09           | 0-38        | 1-01              | 15-71                   |
| Langhorne's Creek                | 0-13           | 0-85        | 1-09              | 14-80                   | Moonta .....                         | 0-03           | 0-39        | 1-03              | 15-10                   |
| Wellington .....                 | 0-29           | 1-18        | 1-30              | 14-64                   | Paskeville .....                     | 0-05           | 0-30        | 0-97              | 15-64                   |
| Tailem Bend .....                | 0-46           | 1-79        | 1-27              | 14-66                   | Maitland .....                       | 0-09           | 0-64        | 1-26              | 19-97                   |
| Murray Bridge .....              | 0-20           | 0-92        | 1-15              | 13-76                   | Ardrossan .....                      | 0-05           | 0-61        | 0-96              | 14-00                   |
| Callington .....                 | 0-08           | 0-95        | 1-26              | 15-31                   | Port Victoria ..                     | 0-03           | 0-65        | 0-95              | 15-44                   |
| Mannum .....                     | 0-17           | 0-84        | 0-99              | 11-53                   | Curramulka .....                     | —              | 0-55        | 1-09              | 17-92                   |
| Palmer .....                     | 0-14           | 0-68        | 1-15              | 15-55                   | Minlaton .....                       | 0-06           | 0-46        | 1-01              | 17-90                   |
| Sedan .....                      | 0-09           | 0-38        | 1-11              | 12-16                   | Port Vincent .....                   | 0-04           | 0-56        | 1-04              | 14-56                   |
| Swan Reach .....                 | —              | 0-18        | 1-12              | 10-65                   | Brentwood .....                      | 0-02           | 0-25        | 0-91              | 15-52                   |
| Blanchetown .....                | 0-03           | 0-31        | 1-24              | 11-14                   | Stansbury .....                      | 0-02           | 0-49        | 1-06              | 16-89                   |
| Eudunda .....                    | 0-20           | 0-50        | 1-35              | 17-13                   | Warooka .....                        | 0-02           | 0-25        | 0-97              | 17-60                   |
| Sutherlands .....                | —              | 0-37        | 0-88              | 10-79                   | Yorketown .....                      | 0-08           | 0-27        | 0-97              | 16-98                   |
| Morgan .....                     | 0-02           | 0-28        | 1-08              | 9-17                    | Edithburgh .....                     | 0-01           | 0-24        | 1-03              | 16-44                   |
| Waikerie .....                   | 0-04           | 0-29        | 1-36              | 9-61                    |                                      |                |             |                   |                         |
| Overland Corner ..               | 0-05           | 0-19        | 1-16              | 10-50                   |                                      |                |             |                   |                         |
| Loxton .....                     | 0-08           | 0-33        | 1-56              | 11-60                   |                                      |                |             |                   |                         |
| Renmark .....                    | 0-02           | 0-19        | 1-26              | 10-52                   |                                      |                |             |                   |                         |
| <b>WEST OF SPENCER'S GULF.</b>   |                |             |                   |                         | <b>SOUTH AND SOUTH-EAST.</b>         |                |             |                   |                         |
| Eucula .....                     | 0-08           | 0-17        | 1-31              | 9-96                    | Cape Borda .....                     | 0-25           | 0-53        | 1-23              | 24-76                   |
| Nullarbor .....                  | 0-03           | 0-05        | 0-86              | 8-62                    | Kingscote .....                      | 0-07           | 0-12        | 1-05              | 19-05                   |
| Fowler's Bay .....               | 0-04           | 0-52        | 0-85              | 11-76                   | Penneshaw .....                      | 0-08           | 0-54        | 1-26              | 18-65                   |
| Penong .....                     | —              | 0-17        | 1-05              | 11-94                   | Victor Harbor ..                     | 0-14           | 0-53        | 1-44              | 21-33                   |
| Koonibba .....                   | 0-10           | 0-45        | 1-17              | 11-64                   | Port Elliot .....                    | 0-18           | 0-50        | 1-40              | 20-02                   |
| Denial Bay .....                 | —              | —           | 0-99              | 11-31                   | Goolwa .....                         | 0-05           | 0-50        | 1-36              | 17-87                   |
| Ceduna .....                     | —              | 0-10        | 0-80              | 9-82                    | Copeville .....                      | 0-07           | 0-49        | 1-16              | 11-58                   |
| Smoky Bay .....                  | —              | 0-31        | 0-75              | 10-44                   | Meribah .....                        | —              | 0-17        | 1-45              | 11-34                   |
| Wirrulla .....                   | 0-04           | 0-06        | —                 | —                       | Alawoona .....                       | 0-06           | 0-40        | 1-28              | 9-98                    |
| Streaky Bay .....                | 0-06           | 0-37        | 0-89              | 14-91                   | Mindarie .....                       | —              | 0-18        | 1-19              | 11-88                   |
| Chandada .....                   | 0-12           | 0-24        | —                 | —                       | Sandalwood .....                     | 0-16           | 0-61        | 1-30              | 13-67                   |
| Minnipa .....                    | —              | 0-20        | 1-43              | 13-73                   | Karoonda .....                       | 0-17           | 0-79        | 1-32              | 14-37                   |
| Kyanoutta .....                  | 0-07           | 0-44        | —                 | —                       | Pinnaroo .....                       | 0-15           | 0-49        | 1-43              | 14-70                   |
| Talia .....                      | —              | 0-48        | 0-68              | 14-76                   | Parilla .....                        | 0-08           | 0-70        | 1-18              | 13-95                   |
| Port Elliston .....              | —              | 0-59        | 0-82              | 16-47                   | Lameroo .....                        | 0-11           | 0-65        | 1-35              | 16-19                   |
| Yeelanna .....                   | —              | 0-22        | 0-70              | 16-03                   | Parrakie .....                       | 0-08           | 0-55        | 1-22              | 14-52                   |
| Cummins .....                    | 0-02           | 0-18        | 1-00              | 17-77                   | Geranium .....                       | 0-09           | 0-46        | 1-24              | 16-49                   |
| Port Lincoln .....               | 0-01           | 0-10        | 1-06              | 19-45                   | Peake .....                          | 0-03           | 0-50        | 1-44              | 16-30                   |
| Timby .....                      | 0-01           | 0-48        | 0-84              | 14-14                   | Cooke's Plains ..                    | 0-29           | 0-63        | 1-19              | 15-47                   |
| Ungarra .....                    | —              | 0-64        | 0-98              | 16-83                   | Coomandook .....                     | 0-25           | 0-57        | 1-18              | 17-34                   |
| Carrow .....                     | 0-01           | 0-74        | 1-04              | 13-38                   | Coonalpyn .....                      | 0-30           | 0-67        | 1-28              | 17-51                   |
| Arno Bay .....                   | 0-09           | 0-79        | 1-02              | 12-46                   | Tintinara .....                      | 0-14           | 0-38        | 1-31              | 18-81                   |
|                                  |                |             |                   |                         | Keith .....                          | 0-13           | 0-85        | 1-40              | 17-93                   |
|                                  |                |             |                   |                         | Bordertown .....                     | 0-08           | 0-29        | 1-47              | 19-35                   |
|                                  |                |             |                   |                         | Wolsley .....                        | 0-06           | 0-28        | 1-33              | 18-41                   |
|                                  |                |             |                   |                         | Frances .....                        | 0-17           | 0-94        | 1-48              | 19-94                   |
|                                  |                |             |                   |                         | Naracoorte .....                     | 0-11           | 1-42        | 1-55              | 22-58                   |
|                                  |                |             |                   |                         | Penola .....                         | 0-34           | 2-48        | 1-89              | 26-15                   |
|                                  |                |             |                   |                         | Lucindale .....                      | 0-30           | 1-81        | 1-37              | 23-07                   |
|                                  |                |             |                   |                         | Kingston .....                       | 0-22           | 1-31        | 1-43              | 24-37                   |
|                                  |                |             |                   |                         | Robe .....                           | 0-26           | 1-02        | 1-53              | 24-61                   |
|                                  |                |             |                   |                         | Beachport .....                      | 0-21           | 1-45        | 1-86              | 26-97                   |
|                                  |                |             |                   |                         | Millicent .....                      | 0-39           | 1-81        | 2-00              | 29-79                   |
|                                  |                |             |                   |                         | Kalangadoo .....                     | 0-59           | 2-78        | 2-72              | 33-34                   |
|                                  |                |             |                   |                         | Mount Gambier ..                     | 0-57           | 2-06        | 2-41              | 30-74                   |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucula (1), Wirrulla (1).



## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

| Branch.           | Report on Page. | Dates of Meetings. |        | Branch.                  | Report on Page. | Dates of Meetings. |        |
|-------------------|-----------------|--------------------|--------|--------------------------|-----------------|--------------------|--------|
|                   |                 | Mar.               | April. |                          |                 | Mar.               | April. |
| Alawoona          | •               | —                  | —      | Eudunda                  | •               | 2                  | 6      |
| Aldinga           | •               | —                  | —      | Eurella                  | •               | 14                 | 11     |
| Allendale East    | 859             | —                  | —      | Eurelia Women's          | †               | 4                  | 1      |
| Alma              | 868             | —                  | —      | Everard East             | 866             | —                  | —      |
| Amyton            | •               | —                  | —      | Farrell's Flat           | 871             | 27                 | 24     |
| Angaston          | •               | —                  | —      | Finniss                  | •               | —                  | —      |
| Appila            | •               | —                  | —      | Gawler River             | •               | —                  | —      |
| Appila-Yarrowie   | 868             | 6                  | —      | Georgetown               | •               | —                  | —      |
| Archburnton       | •               | —                  | —      | Geranium                 | •               | 28                 | 25     |
| Ashbourne         | †               | —                  | 1      | Gladstone                | 866             | —                  | —      |
| Auburn            | •               | —                  | —      | Gladstone Women's        | †               | 13                 | 10     |
| Auburn Women's    | †               | 27                 | 24     | Glenosce                 | †               | 10                 | 14     |
| Bakelava          | •               | 23                 | 27     | Glossop                  | •               | —                  | —      |
| Balhamnah         | •               | —                  | —      | Goode                    | †               | 4                  | 1      |
| Barmera           | •               | —                  | —      | Goode Women's            | †               | 1                  | 1      |
| Beetaloo Valley   | †               | 30                 | 27     | Greenock                 | †               | 9                  | 6      |
| Beialie North     | •               | 2                  | —      | Green Patch              | •               | —                  | 2      |
| Beialie Women's   | †               | —                  | —      | Gulnare                  | •               | —                  | —      |
| Berri             | •               | 4                  | 1      | Gumeracha                | †               | 2                  | 6      |
| Big Swamp         | •               | —                  | —      | Halidon                  | •               | —                  | —      |
| Blackheath        | †               | 5                  | 9      | Hanson                   | •               | —                  | —      |
| Black Rock        | •               | —                  | 28     | Hartley                  | †               | 4                  | 1 & 20 |
| Black Springs     | †               | —                  | 28     | Hawker                   | •               | 3                  | 7      |
| Blackwood         | •               | 9                  | 13     | Hookina                  | •               | —                  | —      |
| Block M           | •               | —                  | —      | Hoyleton                 | †               | 16                 | 20     |
| Blyth             | •               | —                  | 17     | Inman Valley             | 890             | 19                 | 16     |
| Booleroo Centre   | •               | 20                 | —      | Ironbank                 | •               | —                  | —      |
| Boolgun           | 886             | —                  | —      | Jamestown                | •               | 18                 | 15     |
| Boon Plains       | •               | 5                  | 2      | Kalangadoo Women's       | †               | 14                 | 11     |
| Borrika           | •               | —                  | —      | Kalangadoo               | •               | 10                 | 14     |
| Bowhill           | 886             | —                  | —      | Kalyan                   | •               | 18                 | 15     |
| Brentwood         | 875             | 5                  | 2      | Kangarilla               | †               | —                  | —      |
| Brinkley          | •               | 4                  | 1      | Kangarilla Women's       | •               | 19                 | 16     |
| Brinkworth        | †               | 2                  | —      | Kaamantoo                | •               | —                  | —      |
| Brownlow          | •               | —                  | —      | Kaani                    | •               | —                  | —      |
| Buchanan          | 868             | —                  | —      | Kapinnie                 | 875             | —                  | —      |
| Bugle             | •               | 10                 | 14     | Kapunda                  | •               | 13                 | 10     |
| Bundaleer Springs | •               | —                  | —      | Karcultaby               | •               | —                  | —      |
| Bunora            | •               | 4                  | —      | Karoonda                 | •               | 4                  | 1      |
| Bute              | •               | 19                 | 16     | Keith                    | •               | —                  | 2      |
| Butler            | •               | —                  | —      | Kelly                    | 876             | —                  | —      |
| Calca             | •               | —                  | —      | Ki Ki                    | •               | —                  | —      |
| Cadell            | •               | —                  | —      | Kilkerran                | †               | —                  | —      |
| Caliph            | •               | 3                  | 7      | Kongoroug                | 859             | 2                  | —      |
| Caltowie          | †               | —                  | —      | Koolunga                 | 866             | —                  | —      |
| Canowie Belt      | •               | —                  | —      | Koonibba                 | •               | —                  | 2      |
| Caralua           | •               | —                  | 1      | Koonunga                 | •               | —                  | —      |
| Carrow            | •               | 4                  | 1      | Koppio                   | •               | 2                  | —      |
| Chandada          | •               | —                  | —      | Krinda                   | •               | 2                  | 6      |
| Charra            | •               | —                  | —      | Kulkawirra               | 867             | 10                 | 14     |
| Cherry Gardens    | †               | —                  | —      | Kyanoutia                | •               | 3                  | 7      |
| Clanfield         | 887             | —                  | 4      | Kybybolite               | 868             | 3                  | 7      |
| Clare             | 868             | 3                  | 7      | Lameroo                  | 887             | —                  | —      |
| Clarendon         | 890             | 2 & 31             | 27     | Langhorne's Creek        | 890             | —                  | 1      |
| Clave             | †               | 5                  | 2      | Laura                    | •               | —                  | 4      |
| Cobdogla          | •               | —                  | —      | Laura Bay                | •               | 7                  | 14     |
| Collie            | •               | 4                  | 1      | Lenwood and Forest Range | 891             | 10                 | —      |
| Colton            | •               | —                  | —      | Light's Pass             | •               | 2                  | —      |
| Coomandook        | 886             | 27                 | 24     | Lipson                   | 876             | —                  | —      |
| Coonalpyra        | •               | —                  | —      | Lone Gum and Monash      | •               | 4                  | 1      |
| Coonawarra        | •               | 5                  | 2      | Lone Pine                | •               | —                  | —      |
| Coorabie          | •               | —                  | —      | Longwood                 | †               | —                  | —      |
| Coopersville      | •               | —                  | —      | Lowbank                  | •               | 4                  | 1      |
| Coulta            | •               | —                  | —      | Lorton                   | •               | 13                 | 10     |
| Cradook           | •               | —                  | —      | Luchdale                 | •               | —                  | —      |
| Cummins           | •               | 13                 | 10     | Lyndoch                  | 871             | 8                  | —      |
| Cungena           | •               | —                  | —      | McLaren Flat             | •               | —                  | —      |
| Currency Creek    | †               | 2                  | 6      | MacGillivray             | •               | 3                  | —      |
| Cygnat River      | •               | —                  | —      | Mallala                  | •               | 16                 | 20     |
| Darke's Peak      | •               | —                  | —      | Maltes                   | 876             | —                  | 2      |
| Dudley            | •               | —                  | —      | Mangale                  | 877             | —                  | —      |
| Edinville         | •               | —                  | —      | Mannanarie               | •               | 3                  | —      |
| Edgewood Hill     | 875             | 10                 | 7      |                          |                 |                    |        |



## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

| Branch.              | Report on Page. | Dates of Meetings. |        | Branch.                | Report on Page. | Dates of Meetings. |        |
|----------------------|-----------------|--------------------|--------|------------------------|-----------------|--------------------|--------|
|                      |                 | Mar.               | April. |                        |                 | Mar.               | April. |
| Adarama              | •               | —                  | —      | Roberts and Verran     | 880             | —                  | —      |
| Meadows              | •               | 4                  | 1      | Rockwood               | •               | 2                  | 6      |
| Meribah              | 887             | 9                  | 13     | Rosedale               | 872             | —                  | 7      |
| Millang              | •               | 14                 | 11     | Roseworthy             | •               | —                  | —      |
| Millendilla          | 887             | •                  | 2      | Rosy Pine              | •               | —                  | —      |
| Millicent            | •               | 27                 | 24     | Rudall                 | 881             | 3                  | —      |
| Millicent Women's    | †               | 17                 | 17     | Saddleworth            | 872             | 6                  | —      |
| Miltalie             | 877             | 7                  | 4      | Saddleworth Women's    | •               | 3                  | 7      |
| Mindarie             | •               | 6                  | —      | Salisbury              | •               | 10                 | 14     |
| Minnipa              | 879             | —                  | —      | Salt Creek             | •               | —                  | —      |
| Modbury              | 871             | —                  | —      | Sandalwood             | •               | —                  | —      |
| Monarto South        | 887             | —                  | —      | Scott's Bottom         | 891             | —                  | —      |
| Moonta               | •               | —                  | —      | Shoal Bay              | •               | 3 & 31             | 28     |
| Moorelands           | •               | 4                  | 1      | Smoky Bay              | 882             | 7                  | 4      |
| Mooreook             | •               | —                  | —      | Snowtown               | †               | 13                 | 10     |
| Morehard             | 864             | —                  | —      | South Kilkeran         | †               | 3                  | 7      |
| Morphett Vale        | •               | —                  | —      | Spalding               | •               | —                  | —      |
| Mount Barker         | •               | 4                  | 1      | Springton              | 891             | 4                  | 1      |
| Mount Bryan          | •               | —                  | —      | Stirling               | •               | —                  | —      |
| Mount Compass        | †               | 5                  | 2      | Stockport              | •               | —                  | —      |
| Mount Gambler        | •               | 13                 | 10     | Strathalbyn            | •               | 3 & 31             | —      |
| Mount Hope           | 879             | 3                  | —      | Streaky Bay            | •               | 27                 | 24     |
| Mount Pleasant       | •               | —                  | —      | Tallem Bend            | •               | 5                  | 10     |
| Mount Remarkable     | •               | —                  | —      | Talla                  | •               | 27                 | 24     |
| Mount Schank         | •               | —                  | —      | Tantanoola             | †               | 7                  | 4      |
| Mudamuckia           | •               | —                  | —      | Taplan                 | •               | 3                  | 2 & 30 |
| Mundalia             | 880             | 14                 | 11     | Taragoro               | 882             | —                  | —      |
| Murray Bridge        | •               | 5                  | 30     | Tarcowie               | •               | —                  | —      |
| Murraytown           | 866             | —                  | —      | Tarlee                 | •               | —                  | —      |
| Mypolonga            | •               | —                  | —      | Tatara                 | •               | —                  | —      |
| Myrla                | •               | 4                  | 1      | Thrington              | •               | —                  | —      |
| Nantawarra           | †               | —                  | 2      | Tintinara              | 863             | —                  | —      |
| Naracoorte           | •               | 14                 | 11     | Truro                  | 872             | 9                  | 13     |
| Narridy              | †               | 5                  | 4      | Tulkinera              | •               | 5                  | 2      |
| Narrung              | •               | —                  | —      | Tweedvale              | †               | 5                  | 2      |
| Nelaby               | •               | —                  | —      | Two Wells              | 874             | —                  | —      |
| Nelaby Women's       | †               | —                  | 2 & 30 | Ungarra                | •               | 5                  | 9      |
| Netherton            | 888             | 4                  | 1      | Upper Wakefield        | •               | —                  | —      |
| New Residence        | •               | —                  | —      | Uraidla and Summertown | •               | R                  | R      |
| North Booborowie     | •               | 2                  | —      | Vetch                  | •               | —                  | —      |
| Nunjkompta           | •               | —                  | 2      | Virginia               | •               | —                  | —      |
| Nunkeri              | 888             | —                  | 1      | Walkerie               | 889             | 13                 | 10     |
| O'Loughlin           | •               | 9                  | 13     | Wallala                | 883             | 11                 | 8      |
| Orroroo              | •               | —                  | —      | Wanbi                  | •               | 25                 | 22     |
| Overland Corner      | 889             | 3 & 24             | 28     | Wandearah              | †               | —                  | —      |
| Owen                 | 871             | —                  | —      | Warcowie               | †               | 3                  | —      |
| Palabie              | 876             | —                  | —      | Warcowie Women's       | •               | —                  | —      |
| Parilla              | 889             | 17                 | 14     | Warramboe              | 883             | 3                  | —      |
| Parilla Women's      | †               | 20                 | 17     | Wasleys                | 874             | 12                 | 9      |
| Parilla Well         | •               | 2                  | 6      | Wasleys Women's        | 859             | 5                  | 2      |
| Parilla Well Women's | •               | 31                 | 28     | Watervale              | •               | —                  | —      |
| Parrakie             | •               | —                  | —      | Waurattee              | •               | 3                  | —      |
| Parrakie Women's     | †               | 31                 | 28     | Weavers                | †               | 9                  | 13     |
| Paruna               | 889             | 6                  | —      | Wepowie                | 864             | 23                 | 20     |
| Paskeville           | †               | 3                  | —      | White's River          | •               | 10                 | 13     |
| Pata                 | 889             | 6                  | —      | Whyte-Yarcowie         | •               | —                  | —      |
| Penneshaw            | •               | —                  | —      | Wilkawatt Women's      | •               | —                  | 21     |
| Penola               | †               | 7                  | 4      | Williamstown Women's   | †               | 4                  | 1      |
| Penwortham           | 871             | —                  | 2      | Williamstown           | •               | —                  | —      |
| Petersville          | •               | 3                  | —      | Willowie               | •               | 23                 | 27     |
| Petina               | •               | 28                 | 25     | Wilmington             | 866             | 9                  | —      |
| Pimbong              | 880             | —                  | —      | Windsor                | •               | —                  | —      |
| Pinkawillinie        | 880             | —                  | —      | Wirrabara              | •               | —                  | —      |
| Pinnaroo             | †               | —                  | —      | Wirrilla               | •               | 5                  | 2      |
| Pinnaroo Women's     | •               | 6                  | 3      | Wirrilla Women's       | •               | —                  | —      |
| Poochera             | •               | R                  | —      | Wirrulla               | 884             | 18                 | 15     |
| Port Elliot          | 891             | 20                 | 18     | Wolsley                | †               | 9                  | 13     |
| Pygery               | †               | —                  | —      | Wudinna                | †               | —                  | —      |
| Quora                | •               | —                  | —      | Wynarka                | •               | —                  | —      |
| Ramco                | 889             | 2                  | —      | Yacka                  | •               | —                  | —      |
| Rapid Bay            | •               | 12                 | 9      | Yadnario               | •               | 3                  | —      |
| Redhill              | 867             | —                  | —      | Yallunda Flat          | •               | —                  | —      |
| Rendelsham           | 863             | 28                 | —      | Yandiah                | 867             | 13                 | 10     |
| Renmark              | †               | —                  | —      | Yaninee                | •               | —                  | —      |
| Rhyne                | •               | —                  | —      | Yantanable             | •               | —                  | —      |
| Richman's Creek      | •               | —                  | 2      | Yeelanna               | •               | 4                  | 1      |
| Riverton             | 871             | 9                  | 13     | Yorktown-Melville      | •               | —                  | —      |
| Riverton Women's     | •               | —                  | —      | Youngusband            | •               | —                  | —      |
|                      |                 |                    |        | Yurro                  | 890             | —                  | —      |

\* No report received during the month of February.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS. WOMEN'S BRANCHES.

#### THE USES OF HESSIAN IN THE HOME.

[By Miss ELLIE CAMPBELL, Inspector Domestic Arts, Education Department.]

*[Paper and demonstration given at the Lyndoch Conference, February 26th, 1931.]*

How often does mother say: "Oh, I wish I had a handy bag in which to put all these small parcels and packages," whilst she is shopping, especially when all the shops are far away and the necessary week's buying has to be done in one day. With a good bag, one that has been sent as a Christmas or birthday gift, made from either leather or a pretty tapestry, we are careful how it gets treated—no putting it on the floor, nor packing it till the sides appear to object. Instead of this extra worry and precaution, make a handy shopping bag from hessian.

Hessian is made from hemp or jute, thus it is a vegetable fibre, and can be treated in a similar manner to other materials of vegetable origin, such as cottons and cambrics, the only difference that the fibres are coarser and thus need a stronger dye.

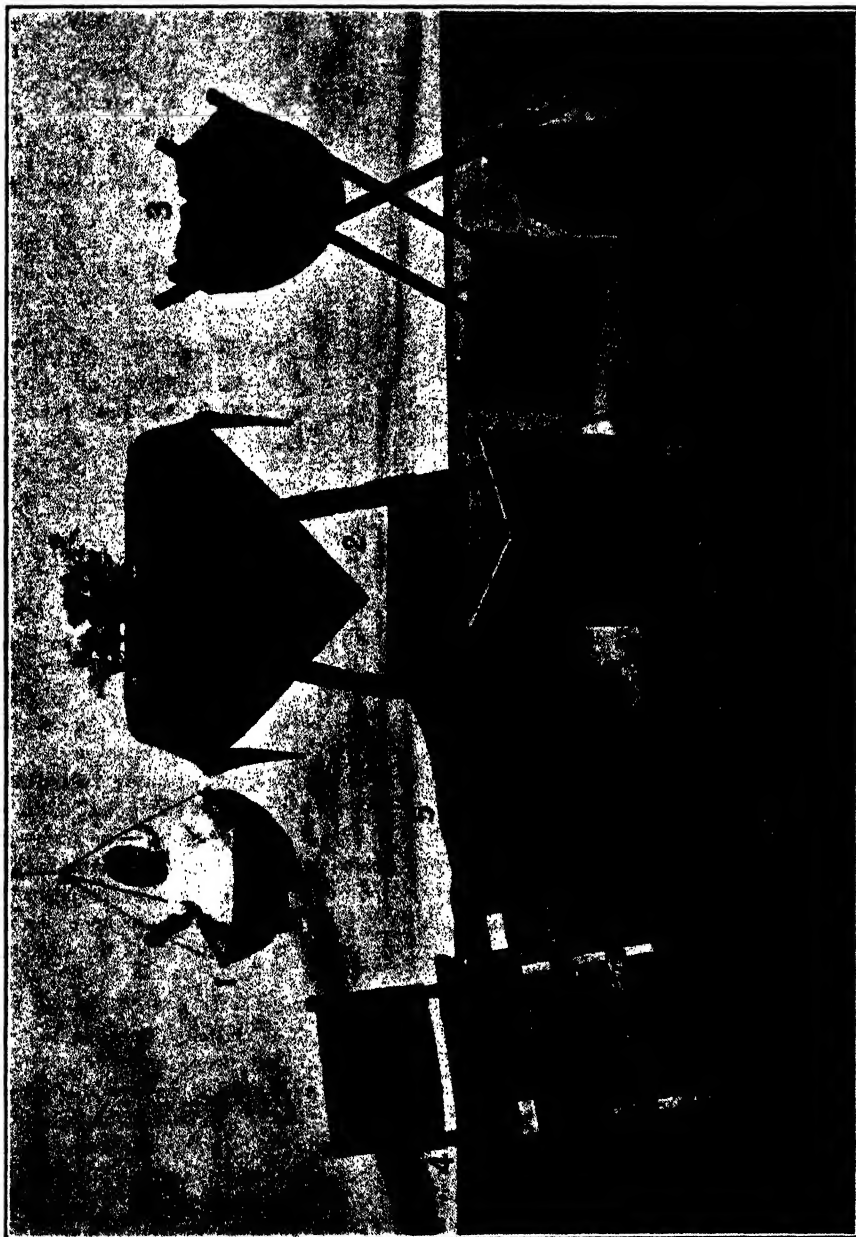
If it is the shopping bag to be made, it will appear so much nicer if the hessian is dyed first, then worked up to the required style. It is easy to dye the material, but care should be taken to select a length of cloth that has the threads as even as possible and very few flaws, if any—that is, thick uneven threads. Run a line of large machine stitching around the edge to prevent fraying whilst it is wet. Soak the hessian in cold water until all the threads are thoroughly soft, as it takes some time for the dye liquid to completely penetrate each thread. Have a liberal quantity of strong dye—the same as a strong blue water on washing days—it takes a lot of dye to make a very satisfactory article. Put the wet hessian into the dye and boil it hard for about 30 minutes, wring it, and when hanging it out to dry be sure it is not creased or doubled up, otherwise it will not dry evenly. To obtain a good appearance it requires a lot of heavy pressing with the hessian very damp. When successfully done there is not much difference between dyed hessian and Arras cloth, but there is a large difference in price. Once the hessian is dyed and pressed it is simply a matter of designing the article and artistically working it up, and finishing it off. In this collection of useful articles various colored dyes have been used to show the effects, and also different materials—wool, raffia, linen, embroidery cottons—have been used to decorate the articles.

In these days of financial depression, when so many economies have to be made, it is generally mother who cuts out her own extra comforts so that father and the children shall not feel the pinch, but with very little expense—only a few pence—



several attractive devices can be made from hessian that will add comfort and pleasure to mother's work and to the home, perhaps there may be one or two articles that father can use.

For the shopping bag it will need a large striking design to work in nicely, as the threads are large and they do not allow fine stitchery to be successfully done. Work the design either in colored wool or raffia, line it with sateen or cretonne, then



sew it into shape and mount it on handles Here is one bag dyed a dark brown, worked with wools, and it has broad wooden handles that were made from the backs of two chairs that had been broken and were beyond repair. Another bag, a lighter brown



dye, worked with raffia, and supports let into hems at the top of bag with material handles sewn on. To make the bag more commodious, let a piece 2in. wide in each side. It will be found that the bag is comparatively light and very durable—it can be pressed often and the fresh appearance retained.

Think for a moment or two of all the walking and standing that has to take place during the day's work in the house, and oh, how the legs do ache; well, with a little effort a handy stool can be made so that mother can sit down to do a number of tasks. Persuade father to make the framework for the stool, and then dye a strip of hessian, use colored wools and put rows of running stitch close together, to give the appearance of striped canvas, work eyelets in the hems so that it can be laced around the bars, and the result is this charming stool which can be easily folded and carried to any place where a task has to be done, such as cleaning silver, preparing beans, and numerous other duties. Similarly hessian can be used for a garden chair; for demonstration purposes this stool has an adjustable back, but the chairs are easily made with a rigid back. It is necessary to have strong hems that will not give away when a little strain is put upon them—double the hessian and be sure of the stitching. Work the strips for the back of chair to match the seat. By lacing the hessian on to the chair, instead of tacking it to the bars, it can be moved around and the wear does not come on the same line of threads all the time.

So far brown dyes have been used, but a very pleasing effect can be procured with lighter dyes. An old saying insists that flies—those opponents to hygiene and terrible pests to the housewife—do not like the color blue, so dye the hessian blue and ornament it with bands of floral cretonne, make a beading at the top and pass a rod through it, use as a curtain at the door. It will allow the air to pass in; will stand any amount of pulling as each person passes through; is sufficiently thick to keep the glare of the sun out, and yet will let plenty of light into the room.

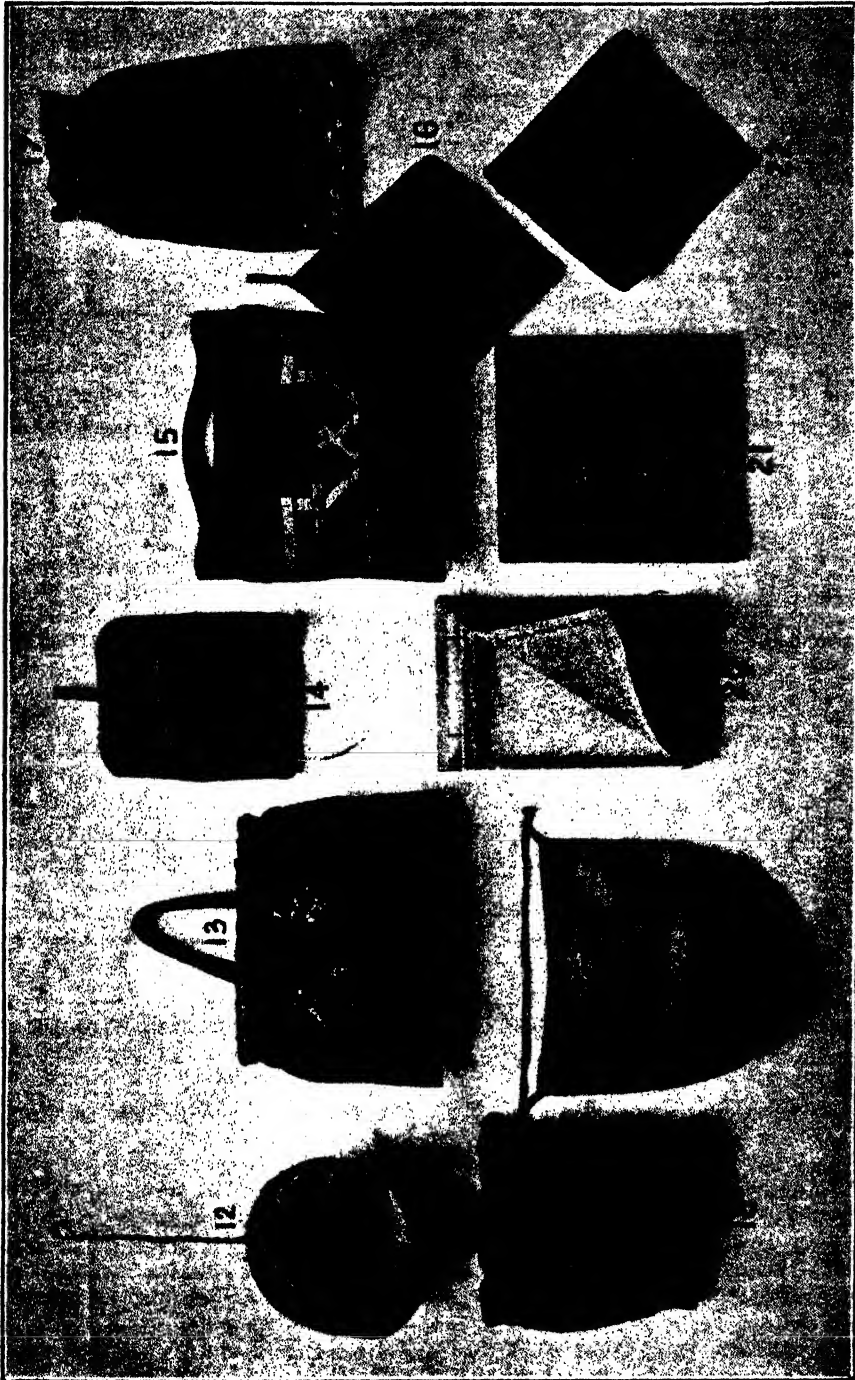
If there is a bed on the verandah or sleepout, have a piece of dyed hessian with a beading top and bottom, ease it on to either a rod or cord and fasten to the top rail of bedstead and to each leg near the floor—this will always look tidy and will appear like a screen, taking away the appearance of a bed. One of the tasks of the housekeeper is to watch that the ticking of the mattress is kept in repair—of course, no one tears the ticking, it is worn by the rubbing on the wire mattress—so to guard against this wear put a covering of hessian over the wire and fasten it down along the sides and at the corners, this will give double life to the ticking, also protect the wire, and if the bed is used in a sleepout it will save the ticking becoming rusted from the wire, as any dampness in the air will cause rust to form. Make good hems, use tapes at the corners, and with tape sew the edge of hessian along the wire—this prevents the hessian moving whilst the bed is being made each day. Another use hessian can be put to in the sleepout is a bedside mat. Dye the hessian according to the color scheme desired; use the hessian double, to give weight and to keep the mat flat; stitch a hem 1in. or 2in. wide all around to save it curling up; work an attractive design on it.

For kitchen use there are many ways hessian can be used. With a double piece 12in. square, bind the edges with a colored bias bind to match the kitchen scheme, and put a tag at one corner with which to hang the cloth near the oven, and every time a hot saucepan or dish has to be lifted—there is the cloth, thick enough to prevent burning the fingers, and yet easily washed on washing day. A similar mat, but no bias binding, simply stitched around, used as a stand for hot saucepans and to protect the table; there is no harm when hot saucepans or baking dishes are placed on it instead of on the table. A little soda in the wash will help to take any grease out of the mat, whereas it takes time and plenty of energy to remove greasy marks from the table.

How often there is the tedious task of separating the scraps from the waste liquid? A handy and cheap rubbish strainer will solve the difficulty. Take a circular piece about 8in. in diameter and a straight strip for the sides—it can be made any depth



desired. Sew this strip to the circle, making a firm seam, this will form a round bag, put a hem around the top and run a piece of strong wire through it—forming a hook



one side and a long handle the other side. Now rest this over a petrol tin and pour all scraps and rubbish through the strainer. It is a fact that dry rubbish does not give off any unpleasant smell, nor does it attract flies to the same extent as it does



when it is wet; so if all scraps are put through the strainer the water can be used on the garden plot and the scraps dried, put in the burner or wrapped in paper and put under the copper on washing day, when the strainer could be scalded.

Then there are the "duster bag," "newspaper or magazine bag," "string bag"—all so easily made and very durable. The hessian can be used either plain or dyed to lend a little color to mother's kitchen—each one can have a place of its own; and oh, the hours of hunting and the questions that mother will be saved, for everybody will know just where to find the article he wants.

For washing days there is the peg bag, in which to keep the supply of pegs in the laundry, also the peg apron in which a few pegs are carried when pegging out the clothes. Some folk like a washing apron made of hessian, but when hessian is wet it is much heavier, and a weight like that hanging from the shoulders or neck is very tiring, and makes one weary. How often on washing day, whilst there is plenty of hot soapy water, most of the floor scrubbing is done? Now to protect the knees and clothing make a kneeling pad—two semicircular pieces of hessian 18in. along the edge, joined to form a cushion and stuffed with old material, about 2in. thick, keeping the stuffing smooth, then a double strip the length of curved edge and about 1in. thick—join the pieces together and put a tag on to hang it up when not in use.

Whilst mother is working baby cannot be expected to sleep the whole day, nor is it safe and convenient to have baby crawling about, and they love movement, so make baby a swing—one out of which he cannot fall. Take a circular piece of hessian about 15in. across (it depends on size of baby) and a piece of flannelette the same size, stitch them together all round, make a hem about 1in. deep in which to put a thick piece of window cord, or a piece of wire to make a firm edge and keep the swing open. Allow the flannelette to be the inside, as it will not irritate the tender skin. Cut two holes, each 2in. to 2½in. in diameter and about 4in. apart, and from 8in. to 9in. from the top—this is to allow the little legs to protrude and thus hold baby in the swing. Baby cannot get a firm enough hold to raise himself and overbalance. At equal distances around the top fasten four pieces of strong cord, and fasten these together about 2ft. above baby. This swing can now be hung under the verandah, or on a tree near where mother is working, and baby is safe and can enjoy its toys.

By this time it is clear that hessian can be a cheap article to use whilst working about the home—and one that will stand hard wear, yet can be easily handled. But a time comes for rest and pleasure, here again we can use the good old hessian. The feet are weary—well rest them on the small hassock which can be kept near the easy chair on the verandah, for the weather will not hurt it; and on the lounge have a brightly dyed hessian cushion, it can be elaborately worked with a cross stitch design, done in colored wools or worked in raffia. It is so serviceable and will stand any amount of throwing about by the children.

For the fire-side cushion, or humpy, hessian is a splendid material; it can be either dyed and worked, or used in its natural state and another cover of cretonne, shadow tissue, or tapestry put over it. They are such comfy seats by the fire of a cold winter night, when you want to get close in, and yet do not want to destroy the polish and surface of the legs of the chairs.

When father is driving home after a heavy day's work, he is tired, and oh, what pleasure to get into the car and rest against a soft cushion—one that just fits into the back and gives a sense of rest. It does not matter about having dusty clothes on, for it is only dyed hessian treated with colored wool, which was left over from some knitting. Shape the cushion like a wedge, so that it will fit into the back nicely. Have a strip of hessian about 15in. by 30in., and another piece 3in. by 45in. This narrow strip is to be shaped at both ends—cut off a triangular piece 1in. by 15in. on either side of each end, and stitch this shaped band to the other piece that has been doubled—this will give a shaped cushion 15in. square, very narrow at one end and 3in. wide at the other end. It makes a good, strong wearing cushion at little expense.



After tea father removes the fire screen, which has been made from hessian, dyed a dark brown, and a suitable design worked with colored wools, and mounted on a hinged frame, the wrong side finished with a braid of same color as hessian; he puts a kindling to the fire and mother joins him, but she brings along her work stand, for lo, there are some socks and stockings that need a little attention, or perhaps some fancywork. This work bag is made of hessian, with applique on the outside to make it attractive. It is lined with a suitable piece of material, and pockets, in which to keep cottons, scissors, pins, and needles, are worked into the bag. A square of hessian dyed a green color and colored linen fruit applied on to it makes such a nice table cover for the verandah.

These articles, and many more, can all be made quite easily and with very little cost. Just remember to soften the fibres before putting material into the dye, and to have the dye of a good strength, then press the hessian whilst it is very damp. A bold design with harmonising colors will greatly enhance the appearance of the work.

#### KEY TO FIGURES.

1. *Baby's Swing*.—The hessian is undyed and lined with a soft material such as flannelette.
2. *Tablecloth*.—The hessian is dyed a dark-green, hem turned up, and corners mitred. Colored linens applied in one corner to represent a cluster of fruit and leaves.
3. *Work Stand*.—The hessian is dyed a dark-brown; two semi-circular pieces for the sides, and a straight piece joined to the curved edges of the sides; line the bag with a pretty cretonne. The sides are gathered by means of draw cords, which are fastened to the cross pieces of stand.
4. *Work Stool (or with back, a Garden Chair)*.—The hessian is dyed a dark-brown, and strands of green and orange wools are run in rows to form colored bands in the hessian. Strong hems are necessary.
5. *Lounge Cushion*.—The hessian is dyed an orange color, and an original cross stitch design worked in colored wools—black, orange, and blue wools.
6. *Fire Screen (or on small scale a Telephone Screen for Table)*.—The hessian is dyed a medium brown, a band of green and yellow wools run across the top, and a simple design worked in wools at the bottom.
7. *Pouf (or Humpty Cushion)*.—The hessian is dyed brown. Two circular pieces, one for top and one for bottom joined to a longer piece which is sewn up the side. A cord is tied tightly around the middle of cushion.
8. *Small Cushion*.—The hessian is dyed and a simple design worked in colored wools.
9. *Motor Cushion*.—The hessian is dyed a nigger brown, and worked with orange wools. Make the cushion a wedge shape.
10. *Hassock*.—The hessian is dyed a brown, and the design may be stencilled on to it.
11. *Bedside Mat*.—Dye the hessian, use it double, and have deep hems. The design may be worked in wools or stencilled.
12. *Rubbish Strainer*.—Be sure to have the seams secure, or it might pull away from the handle. It is 4½ in. to 6 in. deep.
13. *Shopping Bag*.—The hessian is dyed a light-brown, lined with cretonne, and worked with shades of raffia.
14. *String Bag*.—The hessian is dyed a medium green, the opening is buttonholed with green wool, and the word "String" is worked in chain stitch. Paper bag or duster bag may be made by similar method.
15. *Shopping Bag*.—The hessian is dyed a very dark brown, lined with sateen, and wooden handles used. The design is carried out in colored wools.
16. *Oven Cloth*.—Plain hessian used double, bound with bias binding, and a tag put at one corner.
17. *Door Curtain*.—Dye the hessian a medium blue, put a heading at one end for rod or cord. Use floral cretonne to trim the curtain.
18. *Screen Curtain*.—The hessian is dyed blue, and a heading put at both ends for the rod to pass through.
19. *Peg Apron*.—Plain hessian bound with coloured bias binding, and simple design work in wools.
20. *Matress Cover*.—Plain hessian with firm hems all round, and tapes at each corner to fasten to mattress.
21. *Window Screen*.—Plain hessian tacked to a frame, the back neatened with braid.
22. *Iron Duster*.—Plain hessian used double. This may also be used for a saucepan mat on end of table, near the stove.



**BUTTER MAKING.**

[A paper read by Mrs. A. NOTTLE (*Wasleys*) at the Lyndoch Conference, February 26th, 1931.]

At the present time there is a decided movement throughout Australia to improve the standard of the butter industry. The Dairying Act is encouraging the farmer to aspire to better and cleaner milking facilities and surroundings. South Australia has not the green summer fodder which is natural to Victoria and parts of New South Wales, and is so essential a part of good-flavored butter. Still, with a little trouble and pride in her work, the South Australian farmer's wife—even in the drier areas—can do much to improve the quality and flavor of her principal dairy product. *Feed.*—In winter, when green food is plentiful, butter improves in appearance and flavor. When feed is sown specially for cows, I prefer mixed cereals, such as oats and barley. Barley alone imparts to the butter a strong flavor, which is not appreciated. When feeding dry, I prefer crushed oats and bran, damped in very dry weather. It is most essential that cows have access to plenty of clean drinking water. *Milking.*—Milking should be done some distance away from all objectionable odors, such as pigsties, &c., and the cow's udder and teats must be thoroughly cleaned. This applies also to the hands, which should be rinsed before milking each cow. I keep a cloth and bowl in the shed for this purpose. *Separating.*—Separator and milking vessels must be kept perfectly clean. Wash them twice a day in warm water to which has been added a little washing soda, then scald with boiling water and leave to drain. A sunbath fairly often will ensure sweet and wholesome utensils. Always run the cream into an enamel or crockery vessel. See that any enamel vessel that is used is not chipped, or the cream will be tainted. It is not advisable to have the cream too thick—it is impossible to properly stir cream that is very thick. I add 1 tablespoonful of salt to each bowl of cream before mixing and stir the can of cream a couple of times a day. Never run freshly separated cream on to cold cream of a previous separating; this tends to raise the temperature, and it is important for good butter making that cream be kept at the lowest temperature possible. Cool the cream off as soon as possible after leaving the separator. In very hot weather keep a damp cloth around the vessel containing the cream, which should be placed in a draught to hurry the cooling process. When sending cream to a factory, send often and fresh. *Butter.*—Cream assimilates strong odors and flavors very quickly, particularly from such products as onions, fruit, &c. Care must be taken that it does not come in contact with these things. For butter, I prefer cream a couple of days old. Care should be taken to scrape the sides of the churn and beaters before the cream reaches the butter stage, otherwise this partly churned cream will 'make the butter streaky. If not using a churn, use a wooden spoon previously scalded and a crockery bowl. It is a mistake to churn the butter after it reaches the crumbly stage. If left at this stage for a few minutes the buttermilk will work out more easily. Drain off all buttermilk and wash thoroughly twice, then add from ½ oz. to ¾ oz. of salt to each 1 lb. of butter and wash again. Leave stand for a few hours for the salt to thoroughly permeate the butter before pounding. I take what I consider 1 lb. of butter and work it well, using a cloth previously scalded to soak up all moisture. The best time to make butter is toward evening, then "pound" in the early hours of the morning. Put in papers and allow to stand a while in a cool place to firm before marketing.

**FANCY WORK.**

[A paper read by Miss G. GEORGE (*Wasleys*), at the Lyndoch Conference, February 26th, 1931.]

Fancy work is an art from which most of us derive a certain amount of pleasure. Even the little girl in the kindergarten is taught to do darning stitches, working them into simple designs on cheese cloth, and comes to look forward to the afternoon set aside for fancy work at school. The days have long passed when girls would put in months at crocheting and working bedspreads and tablecloths, as was the custom in the days of our grandmothers, and which now we would discard, as out of date, and unsuitable to modern furnishings. The colored linens now so fashionable can be bought at any drapers for a very few pence, stamped with such easily worked and effective designs, that most of us would find it tiresome to bother about anything more complicated. In any kind of work, much depends on the choice of materials and threads, also scissors, needles, bodkins, &c., need a certain amount of care in selection. Scissors should be



sharp, and have fine points, or jagged edges will result, which are much harder to keep neat when working, and thus greatly spoil the effect of an otherwise good piece of work. Fine needles and thread usually produce the best results, and stranded cotton seems to be favored by most people, although D.M.C. is now much used, and is equally as good, and has a more lasting sheen. Many of us at some time or other have had a favorite design, which we have found very hard to match. This can be rectified by a little carbon paper, or, failing that, mix a little sugar and blue, and go over the lines of the faded transfer, allow to dry thoroughly, and then press with a hot iron in the usual way. I now wish to draw your attention to the ever-popular Richelieu work. It certainly takes longer to do, and requires more care in cutting out than most work; but, after all, do not the results more than repay one for the time spent in doing it? Then there is the seldom heard of Hedebo work. Like most needlework of real merit, it is of ancient origin, and has been introduced into this country from Denmark. Hedebo work consists of a number of simple shapes, such as circles, squares, lozenges, shields, &c., arranged to form a pleasing design upon the material, also a number of other stitches, such as satin stitch, snail train, or in fact any Mount Mellick stitches are employed, as these serve to throw up the pattern and increase the effect. Needles for this should not be too fine, a fine needle makes the stitches too close and firm. Thread used must be linen and of a fine and unfraying make. Knox's linen thread, No. 60, is recommended for the purpose. Stamped designs for Hedebo needlework cannot be obtained in Adelaide, so anyone taking up this work will find it necessary to buy the linen and draw their own. Care must be taken when choosing material to get it close and firm in texture; a soft, open linen is quite unsuited for this purpose. Any woman who decides to take up this work will find it most fascinating, and that the first piece will not be the last by a very long way. Last of all, there is tatting, which is very pretty in d'oyleys, &c., and makes a dainty finish when used as edgings for guest towels, handkerchiefs, fuji sets, children's frocks, and many other articles of wearing apparel. For making tatting, a small shuttle, not more than 2½ in. long, is best for all threads, excepting the very coarse. In winding thread around the shuttle, care must be taken not to wind too much at one time; this will cause the shuttle to gape apart at the ends. The thread mostly used is the ordinary mercerised crochet cotton, but for silk articles it is, of course, necessary to use Fibrone or any of the other numerous makes of reel silk. There is now so much machine work, which closely resembles the hand, and it is so inexpensive, that most people these days do not bother to interest themselves in hand work, which, it will be found, wears better, looks nicer, and for gift and other purposes is always much more appreciated.

### FRUIT DRYING.

[A paper read by MISS L. DENNISON at the Lyndoch Conference, February 26th, 1931.]

Of all the duties included in the term "household management" none demands such resourcefulness on the part of the housewife as the preparation of foodstuffs. The housewife who wishes to keep healthy those dependent upon her for good wholesome diet, should insist upon the daily consumption of fruit or green vegetables. In winter and early spring, this is rather a serious problem; on the whole, vegetables are fairly reasonable in price, but these do not take the place of fruit. A good supply of dried fruit

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on hand can be used to advantage to bridge the gap between the end of the apple season and the arrival of the stone fruit. Of course, they cannot take the place of fresh fruit, but they can be used very successfully. Drying is a primitive method of preserving food. In this operation a large proportion of water is extracted. As the apples are ripening, there are always a lot of windfalls with quite good apples going to waste under the trees. One method of partly eliminating this waste should be to dry the surplus apples. One of the most popular of dried fruits is the apricot. The apricot to be dried is not picked until it is fully ripened upon the tree; the riper the fruit the more sugar it contains, and the flavor becomes more fully developed. To keep apples and apricots a good color during the drying process, the fruit is treated with sulphur fumes. These are in such a diffused form that they are not at all injurious to health. Dried apricots make an ideal jam; 1lb. dried apricots equals the weight of 5lbs. of fresh fruit. *Dried Apricot Jam.*—Wash 2lbs. of dried apricots, soak overnight in 2 quarts of cold water, drain the water off into preserving pan and add to it 5lbs. of sugar, bring to the boil, add fruit, and cook quickly for half an hour, stirring constantly. *Apricot Conserve.*—3lbs. of dried apricots, one 2lb. tin of sliced pineapple, 6 cups of sugar, ½lb. of almonds, 1 lemon. Wash apricots, soak overnight in 9 cups of water, cut pineapple and add with juice to apricots, simmer gently until tender, stir frequently, add sugar, boil 10 minutes, add lemon juice and almonds cut into strips, boil 5 minutes longer. An important advantage in using dried fruits is that jam made from them does not ferment. Again, the housewife may spread the jam making over a longer period of the year, and may cook these fruits, at least, when the weather is cool. Peaches, prunes, and duchess pears can also be dried successfully. There are many varieties of dried grapes. Raisins have been called the traveller's friend, for they are very nutritious.

### GELATINE.

[A paper presented by MRS. S. SCHUNKE (Wirrilla) at the Lyndoch Conference, February 26th, 1931.]

As quite a number of cold dishes contain gelatine, it will be well to learn of its different uses. The addition of gelatine to milk and milk mixtures prevents the formation of tough curds and enables the body to obtain the full amount of nourishment. The addition of a very small quantity of gelatine to baby's food ensures complete digestion. Medical authorities recommend the giving of 2 teaspoonfuls of this mixture just before each feeding period:—1 saltspoonful gelatine, ½ cup (½ pint) boiling water. For children 9 to 12 months old, allow ½ teaspoonful of gelatine to every pint of milk in the day's supply. Left over foods of all descriptions, such as meat, vegetables, fruit, and cake can be used and made into the tastiest of dishes by adding gelatine, and the housewife will find it invaluable, in that these dishes can be prepared any time and set aside until required. Fruit juices can be used for cake fillings, allowing one dessertspoon of gelatine dissolved in a little hot water, then stirred into one cup of juice, then set in a cake tin to fit the cake. When set, turn out and place between the layers of cake. Either lemon juice or a pinch of citric acid brings out the full flavor of the ingredients. Gelatine has no flavor, so add flavorings very carefully. A good plan is to taste the dish as it is flavored. Fruit should be stewed and flavored, the juice strained off, and measured by the cupful or half-pint, and if necessary water may be added to make the measure level. Always allow one dessertspoonful of gelatine to every half-pint of liquid, dissolve thoroughly in a little of the hot liquid, then add to the remainder of the fruit juice and mix well together, set aside and when beginning to thicken, add the fruit. When making a larger mould, care must be taken to see that the first layer is set before pouring in the next—if several colored jellies or fruits are used—to have three or four layers when turned out. Spices and curry for flavoring meat dishes are best sprinkled very lightly among the slices as they are being placed in the mould. Food is judged by flavor; no matter how good food is, if its taste is not pleasant, it will never be acceptable. A clear, well-flavored jelly is best for setting salads or vegetables; tiny individual moulds or egg cups are found the most effective to set these in. Salads served in this way, are very attractive. Beetroot in jelly preserves all the delicate flavor of the vegetable, and none of its juice is lost, for it surrounds the slices and cubes in the form of a jelly. Gelatine is used in a great variety of home-made sweets. It is useful as a thickening for soup and gravy. It is nourishing and enriches these liquids. It is also an excellent substitute for the whites of eggs in cake mixture. Eggs are often scarce, however, the cake still preserves its feathery texture by the addition of a dessertspoon of gelatine dissolved in a little hot water, then whipped to a stiff froth and beaten lightly into the mixture.



*Recipes.*—*Sheep's Tongue Shapes:* 2 dessertspoonfuls gelatine, 3 sheep's tongues, pepper, and salt, 2 cups stock. Boil tongues until tender, skin and slice finely. Arrange nicely in round cake tin. Fill tin with slices, then dissolve gelatine in clear hot stock, add pepper and salt, pour over tongues, and allow to set. Turn out and garnish with shredded lettuce, sliced tomato, and parsley. *Fruit Filling:* 1 dessertspoon gelatine,  $\frac{1}{2}$  cup hot water, 2 dessertspoons sugar, slices of fruit, peaches or bananas, lemon essence. Dissolve gelatine and sugar in hot water and add flavoring. Pour into a sandwich tin and arrange slices of fruit. When set, carefully turn out on to a layer of cake and cover. Cream may be first spread over. *Carrington Mould:* 3 $\frac{1}{2}$  dessertspoons gelatine, small tin peaches, 4 dessertspoons sugar, 2 cups (1 pint) water, juice of a lemon, 1 cup milk, vanilla, cochineal. *Directions.*—For first layer: Strain juice from peaches, add water, lemon juice 3 dessertspoons, and 2 $\frac{1}{2}$  dessertspoons gelatine. Place all in a saucepan on the fire, stir until gelatine is dissolved, pour a little into a round cake tin, and arrange thinly sliced peaches, pour in a little more jelly, then allow to set. The jelly left over will be required for the third layer. For second layer: Add sugar and essence to the milk and stir until the sugar is dissolved. Dissolve 1 dessertspoon of gelatine in a little hot water and when nearly cool mix into the cold milk and pour on to the peach layer. For third layer: Take remaining jelly from No. 1 and remelt if it has set, add a little cochineal, and when blanc mange is firm, pour on the red jelly and allow to set. Turn out on a flat glass dish.

#### WASLEYS.

December 4th.—Present: 28 members and five visitors.

Sister Machiel, of Gawler, spoke on "Nursing and her Experiences at Oodnadatta while Serving on the Inland Mission." Questions submitted through the Question Box were:—"What causes a sponge to fall after being taken from the oven?" Answer—Oven too hot. "What will take transfer lines that are not covered out of linen?" Answer—Glycerine. "Should tomatoes be watered in a trench or sprinkled?" Answer—"Through a trench mainly, but sprinkled occasionally to keep the foliage clear of insects." (Secretary, Mrs. A. Wilson.)

### SOUTH-EAST DISTRICT.

#### ALLANDALE EAST.

Meeting held September 5th. Present: 11 members. The meeting was devoted to consideration of the Congress agenda and Crop and Pasture Competitions. (Secretary, Mr. T. Earl.)

#### KONGORONG.

Ten members were present at a meeting on September 8th. Mr. A. S. Dixon read a paper dealing with "Luug Worms in Sheep," and a good discussion took place.

A further meeting was held on October 8th. Nine members were present.

DAIRYING ON SMALL FARMS was the subject of the following paper read by Mr. W. H. Downes (District Dairy Instructor):—At the present time, in view of the general financial depression existing in Australia, and as a direct consequence the low prices received for most classes of primary products, it would appear advisable for farmers to seriously consider turning their attention to something more remunerative and offering more reward for their labor. Dairying as an alternative has been suggested by those in a position to know in those districts which are suitable, as it appears to be the one industry which has been least affected by decreases in market values. During past seasons the Paterson scheme has in a large measure been responsible for the general stability of this industry, and the good prices received in Australia for dairy produce can be directly attributed to its operation. Without it, dairying generally would have assumed a much less healthy aspect, for instead of the supplier receiving 1s. 8d. to 1s. 10d. per lb. for butterfat, he would have had to be content with 1s. 1d. to 1s. 3d. per lb., or in other words, London parity price. Be that as it may, dairying still offers fair opportunities to the man so inclined to take it up seriously, and certainly appears to be the most favorable avenue to assist many South-Eastern farmers in making good on the land. I could quote numerous instances where the keeping of cows has proved the salvation or mainstay of hosts of farmers, who had they relied solely on other farming pursuits for their livelihood, would have assuredly gone under. Although there are some disadvantages connected with dairying, due to its being an all-weather occupation, necessitating constant attention, and possibly early and late hours, there are several redeeming features that should not be overlooked, and possibly outweigh any of the so-called hardships it involves. These could be briefly enumerated as follows:—(1) It



provides a regular and constant income, which may be the means of financing farm operations, &c., until such time as the main cheque is available; (2) the busiest time of its operation can be regulated so as to interfere as little as possible with other farming practices; (3) it provides a ready means of utilising on the farm fodders that might otherwise be considered useless or of little commercial value; (4) the by-products, such as skim milk, are available for the purpose of rearing young stock, such as calves and pigs; (5) the manure when conserved and applied to the land is most beneficial in maintaining soil fertility.

*Advantages Gained by Enlarging the Herd.*—Many farmers who at present keep only a few cows would be well advised to increase their stock to the largest number possible to be kept with convenience. Usually the keeping of a few cows means that only a small quantity of cream is available, and, in consequence, delay in the delivery to the factory. In some cases the cream may be kept so long as to seriously affect its quality, and being of low grade, the supplier has to be content with correspondingly low prices. By having a larger herd, the supplier should almost invariably secure top prices, because having more cream to deliver, it will be sent more frequently, and in this way be much improved in quality. Apart from a quality point of view, there is no doubt that immediately a certain line of business is found to pay, and as a consequence is enlarged or further developed, it usually receives more care and attention to detail than was previously the case.

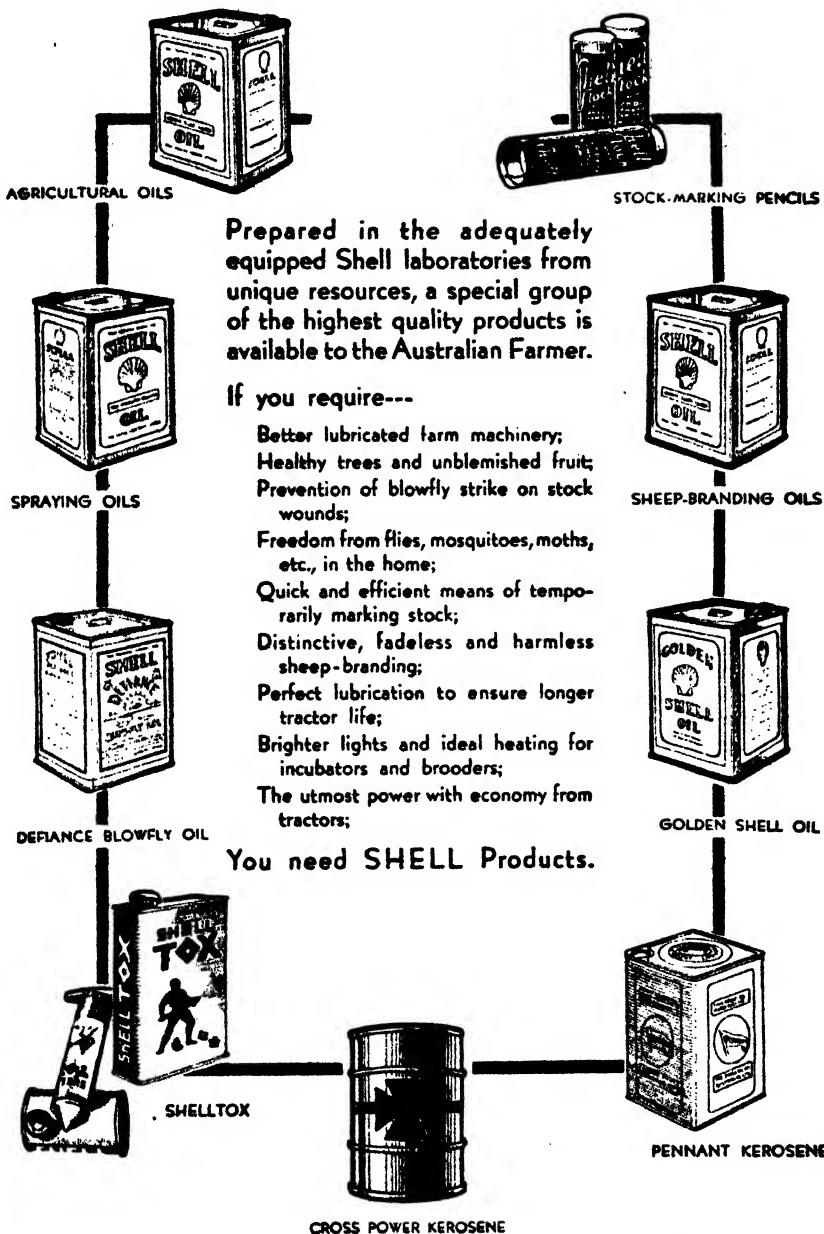
*Profits from Dairying.*—Before discussing details and figures connected with the actual profits from dairy cows, it might be as well to mention certain essentials which may mean either success or failure. The intending dairyfarmer might well ask himself the question, In what way and by what improved methods can I hope to make a success of dairying? This very reasonable question can be answered as follows:—(1) By securing good stock in the first place, improving the quality and production of the existing animals, and culling out the poor producers; (2) by feeding consistently, intelligently, and economically; (3) by careful attention to the treatment and management of the herd; (4) by the proper care of dairy produce on the farm. Each of the foregoing suggestions will be dealt with in their order.

(1) It is not intended to suggest that the farmer should invest in a pure bred herd. Such a procedure would entail a heavy outlay that would probably be beyond his means. He should, however, endeavor to secure a pure bred bull, with which his existing stock can be greatly improved until eventually the animals reach the standard of well bred grades. It is a well-known fact that milk or butterfat production is a hereditary characteristic, readily transferable to the young. Animals which have been bred from high producers, with this object always in view, should be almost invariably superior to those raised from common stock, with no special claims to breeding or production. Therefore, by introducing into the herd a pure bred bull, descended from a noted line of ancestors, a general improvement should be noticed in young stock, from both quality and production standpoints. This, generally, is the most economically method of herd improvement, particularly in this State, where a subsidy scheme for pure bred bulls exists. Under this scheme, any purchaser of a pure bred bull that is eligible is entitled to a refund of 60 per cent. of the purchase price. These bulls are of the right age for work (10 months to five years), and, besides carrying a health certificate to say they are free from tuberculosis, are the progeny of dams that have passed the butterfat standard for their age. This scheme, undoubtedly a generous one, should appeal to anyone who seriously contemplates improving their existing herd. Proper culling of stock by herdowners who are not members of a testing association will be a problem unless they decide to do their own testing. This should not be a difficult matter to the progressive man, and the small cost of the necessary equipment might easily be saved during the first year. Testing should be done regularly once monthly and full records of each cow's production kept for reference purposes.

(2) The feeding of stock is equally important, as it is practically useless possessing good stock if they have not the wherewithal to produce abundantly. Although dry feeds, such as chaff and grain, will supply the bodily requirements of dairy stock, and in this way augment milk production, there is nothing to equal green fodder of the right kind. This need may be supplied in two ways. (a) By sowing down suitable pasture grasses and clovers which, when regularly top dressed, will yield an abundance of luxuriant fodder. Such growth will eventually choke out the valueless plants and weeds. It may be profitable to close up a section of the grazing area periodically for grass hay. This ranks high as a fodder for milch cows, and will prove very acceptable at times when there occurs a scarcity. (b) By supplementing the pastures with suitable crops which, if planted in rotation, will provide a regular supply of fodder. These may be either cut and carted out to the stock, or grazed, but the latter method, though involving less labor and time, is usually more wasteful. In districts where dairying is extensively carried on, it is generally the practice to sow more crops than are immediately required for feeding in the green state. The balance of these are usually placed in some form of silo and fed later on as ensilage. In crops so treated, almost the whole of the succulence is retained, and harsh or spiny plants, such



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as thistles, are softened in the process and made palatable. There is a large range of fodders suitable as green feed for dairy cows. These include such crops as lucerne, maize, sorghum, Sudan grass, cereals, peas, and certain root crops. Lucerne, "the king of fodders," is one of the most useful if it can be grown in the district. It can be successfully grown without irrigation in districts with only a 20in. rainfall, and as a fodder crop has many points to recommend it:—(a) It is a profitable crop, and should considerably enhance the carrying capacity and land value of holdings. (b) Generally speaking, it excels most other crops in yield per acre and feeding value. (c) Its ability as a drought resister and soil enricher are well known. (d) It can be utilised in various ways—in its green state, either by cutting or grazing or converted into hay or silage. (e) The continual cutting of the crop helps to minimise the weed menace. (f) In comparison to its yield and fodder value, the cultivation and harvest costs are not excessive. (g) It is eminently suited to the feeding of all classes of farm stock, viz., cattle, horses, sheep, pigs, poultry. (h) The fire risks ever present in the case of ripe cereal crops, either standing or in stacks, are almost eliminated when lucerne is the chief forage crop grown on the farm. (i) Being a perennial, lucerne should not require replanting for a number of years, particularly if careful harvesting and cultivation methods have been employed. (3) *Treatment and Management of the Herd.*—The cow is an animal of regular habit, and responds favorably to such treatment. This means that the hours of milking should be as regular as possible, for there is probably nothing that reduces a cow's production more quickly than through being milked early one day and late the next. It is reasonable also to expect that cows will respond better when the milking hours are as equally placed as possible, i.e., as nearly approaching 12-hour intervals as convenient. Excitement, fright, or rushing about are not conducive to milk secretion; for this reason cows at all times should be carefully treated and dogs kept out of the cowyard. When cows are within three months of calving, they should be dried off and turned out to rest quietly in a suitable paddock away from the main herd. This should be large enough to permit of exercise and so situated that the animals are continually under observation. *Rearing the Calves.*—On small farms it may be inconvenient and hardly advisable to rear all the calves which are born. The farmer as far as he is capable will then have to select only the best calves for this purpose. Their healthy development will depend very largely on the treatment they receive and the feeding method employed. Newly-born calves, after removal from their mother, should receive the mother's milk (10lbs. daily) for the first week, or, failing this, as in the case of the death of the cow, add the white of an egg to each feed. During the second and third weeks whole milk will be sufficient, and the quantity increased to about 12lbs. daily. In the fourth week a gradual change may be made in the milk diet by breaking down the whole milk with increasing quantities of skim milk, so that by the end of this week the calf is on a ration consisting entirely of skim milk. It will now be necessary to replace the butterfat removed with a suitable substitute. Boiled linseed meal is recognised as being ideal for the purpose, added at the rate of half a pint of the porridge to each feed. Calves should receive milk ration till five or six months old; they can then be weaned and turned out to fend for themselves. In connection with calf feeding, it is most important to note that all milk should be fed at the correct temperature, i.e., blood heat, and be in sweet, fresh condition. Never vary from the regular quantity suddenly or appreciably, as calves allowed to overgorge will become victims of digestive troubles that may be infectious and frequently prove fatal. (4) *Care and Treatment of Dairy Produce.*—Although this item has been mentioned last, it does not signify that it is the least important. On the whole the climate of the South-East is very favorable in assisting the keeping qualities of cream, but unfortunately many suppliers place too much reliance in weather conditions, so that during warm spells cream quality often suffers, either through being held too long on the farm or some other form of neglect. The losses incurred through low quality cream may seem only slight, but if allowed to continue soon mount up, and might easily have been avoided if the cream had received reasonable care in the first place. The causes of low quality cream may be briefly enumerated as follows:—(1) Faults in the milking methods; (2) carelessness or neglect in connection with separating; (3) an unsuitable test for the existing conditions; (4) wrong treatment of cream after separating; (5) faults in the method of transport. Suggestions for correcting the above troubles are as follows:—Wash all cows' udders and teats prior to milking, and see that the milkers themselves are cleanly attired, with clean hands. The milking buckets, &c., should be kept scrupulously clean, and milk properly strained. The dairy buildings and surroundings should be well drained, clean, and free from objectionable smells. The separator should be taken apart after each skimming and the parts thoroughly cleaned and scalded. The butterfat test of cream should not be allowed to go to extremes, either too high or too low. For summer months, a test of 42 per cent. to 45 per cent. is recommended and for winter 38 per cent. to 40 per cent. Stir all cream regularly, and cool if possible during the summer months.



Stirring will tend to remove any gases developing in the cream and create an even ripening, whilst cooling will considerably retard any fermentation. Never mix warm and cold cream together, as the latent germ life in the latter will immediately assume activity under the more favorable conditions of temperature thus produced. All cream should be stored, in suitably tinned or enamelled containers, in a well ventilated room where the atmosphere is cool and pure. Transport is not always under the farmers' control, and in some cases difficulties or delay in transit may be responsible for inferior quality, as cream deteriorates rapidly when closed up for any length of time. Particularly is this the case in hot weather when cream may become exposed to direct heat while in the can. The supplier can at least see that the cream is forwarded as regularly as possible, and, if delivering it himself, should endeavor to keep the cans shaded from the sun. *Actual Returns from Dairy Cows.*—The average production of butterfat per cow in South Australia is estimated at 160lbs. per annum—a rather low figure. As there are a good many officially tested herds in the State that would practically double this figure, it naturally follows that there are also many remarkably poor producers. A conservative average for a good herd would be 240lbs. of butterfat per head. Estimating the value of butterfat all the year round at 1s. 6d. per lb., a cow should bring in approximately £18. In addition, there is the value of her calf and any surplus skim milk, but these items can be reasonably offset against the actual costs and working expenses of dairying. On high-class dairying land it might take two acres to run a cow, when the profit would be £9 or more per acre, but even on lesser land, if it took three acres per head, the return per acre would be £6. In conclusion, dairying should prove a profitable proposition in many parts of the South-East on suitable land, as the rainfall is generally fairly sure. Returns from dairying are regular and frequent, and there is possibly no other animal that returns more per acre in the closer settled districts of the world than the dairy cow. (Secretary, Mr. S. Johnson.)

#### KYBYBOLITE (Average annual rainfall, 22in.).

Fifteen members and four visitors attended the meeting held on August 15th, which took the form of a visit of inspection of the Kybybolite Experimental Farm. (Secretary, Mr. F. Martin.)

#### RENDELSHAM.

A report of the proceedings of the Annual Congress was given at the meeting held on October 4th by the delegates who represented the Branch at the various sessions. Twelve members and five visitors were present. (Secretary, Mr. F. White.)

#### TINTINARA (Average annual rainfall, 18.51in.).

September 27th.—Present: Eight members.

LUCERNE GROWING was the subject of a paper by Mr. D. O'Dea. Mr. O'Dea had grown lucerne for several years, and had 250 acres established on country of a sandy nature with a close subsoil and with water from 5ft. to 7ft. from the surface. The best method of sowing was to seed with a cover crop of oats or wheat, first sowing oats with 60lbs. of super and then cross sowing—without the discs of the drill—with 3lbs. of lucerne and another 30lbs. of super. The object was to sow as shallow as possible and yet cover the lucerne on a firm seed bed. It was very beneficial to spring-tooth the established plots, and if there was enough grass to carry a fire, burning improved the growth. Lucerne was most profitable when cut for hay and fed with oats or wheaten hay, thus making a balanced ration. As much as three tons per acre a year had been cut on his property. When feeding it was best to feed down quickly and hard, and to work the plots in rotation.

The Meeting on October 18th was held at the homestead of Messrs. McIvor Bros. It was attended by six members and five visitors, who made an inspection of the crops and pastures on the property.

The annual meeting was held on November 29th, 15 members being present. The annual report was read by the Hon. Secretary (Mr. B. Fotheringham), and officers were elected for the year.

### UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

#### APPILA-YARROWIE (Average annual rainfall, 14.69in.).

October 3rd.—Present: 14 members.

NEW HINTS FOR THE FARMER.—The Chairman tabled a coupling for horses. One end of the coupling had a spring clip made out of hoopiron; about 10in. of material was used, the clip being about 4in. long. On the clip was a link with a lip cut away, so that it would not cut the leather. The leather was adjustable to various lengths.



One member said that a blower for a forge could be made from a separator; another member said an old winnower also made a good blower. *How to Make Belt Dressing.*—Hold a tyre tube over a flame; every particle must drip. Do not allow pieces of tube to burn off and not melt. Allow the particles to drip into a pail of water. Later pour off water and bottle the melted tube and use as required. *Plough Grease.*—Melt tallow and mix with a little used crank case oil from a car and a little resin. The resin keeps the grease from running off the axle when warm. On no account allow the axle to become dry. *Brooder for Chickens from Incubator.*—Enclose a small space, leaving an opening for chicks to enter; cover space with a sheet of iron or as much as required, leaving enough room for chicks to get under iron. On the iron place stable manure, a fair quantity. Stable manure put on a dead beast and then set alight will entirely burn same, giving little smell, little smoke, and no flame. (Secretary, Mr. E. Wurst.)

#### MORCHARD (Average annual rainfall, 13.50in.).

September 12th.—Present: 15 members.

Mr. A. Piggott read the following paper entitled "Cows, Feed and Breed":—"In the keeping of dairy cows, feed is of more importance than breed. No other farm animal requires as much attention, so far as feeding is concerned, than the cow, producing as she does an enormous weight of milk during her lactation period. Consequently she must be well fed at all times to obtain the best results. In this district, cocky chaff could be used as a roughage, and with the addition of bran and crushed oats, makes reasonably good feed. Where mangers are not erected in front of the bails, the chaff should be fed out of nosebags to prevent waste. A stubble paddock should also be sown early with a mixture of oats and rye for green feed. Although feed is of such importance, it will be well to begin with as pure a strain as possible of the desired breed. If not pure-bred cows, at least a pure-bred bull should be used. The Dairy Cattle Improvement Act has done much to improve the class of cattle in this State, and more advantage should be taken of the subsidy in the purchase of pure-bred bulls, the bull being equal to 50 per cent. of the herd. Many farmers have the mistaken idea that pure-bred cattle are more delicate than mongrels. The mongrel, or scrub bull, as he is commonly called, is the dearest bull in the world, and the greatest menace to progressive and profitable dairy farming. The breed to be kept is a matter of choice, there being good milking strains in many breeds. If milk is required, the Friesian could be recommended; if for cream production alone, the Jersey would probably take pride of place. In a mixed farming district dual purpose cattle would be the better proposition, and for that purpose the Milking Shorthorn is hard to beat. There are good milking strains of them, they are exceptionally hardy, and are reasonably good for beef purposes. The calves sell well as vealers, or in normal seasons can be kept to fatten as steers. This State imports annually from other parts of the Commonwealth £200,000 to £400,000 worth of butter. The facts are that owing to the easier manner in which an income from cereals or wool was obtained and the less labor necessary, producers turned more attention to sheep and wheat growing, and in consequence dairying has languished for many years. In the year 1924 the number of cows in this State was 145,000, while in 1929 there were barely 100,000. The return from the herd is practically continuous throughout the year. When it is remembered that the cash returns from the factories are sent fortnightly to the producers and the money is thus quickly turned into circulation with immediate benefit to the State as a whole, the need for dairying is apparent. By experiments carried out in other parts of the world it has been found that growing children require at least one pint of milk per day. We seldom realise the benefit the cow is to us. Of all the animal friends of man, the cow is the greatest. If, as you are about to sit down to the midday meal, I might remove from your table what the cow has helped to place thereon, I would take the cup of milk waiting at baby's chair, the cream, cheese, butter, custard pie, cream biscuits, steak, roast of beef, and leave you to make a meal of potatoes, pickles, and pepper. There is not a thing from nose to tail that is not made use of by man. We use the cow's horns to make combs, her skin upon our feet, her hoofs make glue, her tail makes soup. She gives milk and cream, &c., and her flesh is the greatest meat of the nation. No other animal works for man both by day and by night. By day she gathers food and at night converts it into the things of which I speak." Messrs. Lillecrape, McCallum, Lang, and Tilbrook took part in the discussion which followed. (Secretary, Mr. A. McCallum.)

#### WEPOWIE (Average annual rainfall, 13in. to 14in.).

September 29th.—Present: 10 members.

In the course of a paper, "Care of Farm Machinery," Mr. J. Crocker said that few people realised the enormous sums spent annually by farmers in the purchase of machinery. The plant required for the working of an average wheat farm cost from



£500 to £750. The depreciation on machinery—frequently as high as 20 per cent.—was a very heavy charge upon production costs. The very high rate of depreciation was usually due to the careless use of implements, and costs of production could be reduced by bestowing a greater amount of care upon tools and implements. It was obvious that if machines were housed and kept in a better state of repair they would last much longer and do more efficient work. The saving of £25 in depreciation for one year was equivalent to a saving of 2d. per bushel in the production of 3,000 bush. of wheat. Three important points in the care of farm machinery were housing, repairing, and painting. A machine which was kept running when badly adjusted or when in a bad state of repair could not perform efficient service, and the rate of depreciation would be increased, because the wear and tear upon all parts of the implement was increased. Repairs should be made systematically and at times when there was no urgent productive work to be done. Nothing added so much to the appearance of a vehicle or an implement as a good coat of paint, though of greater importance than the appearance was the fact that paint was an excellent preservative. It filled the pores of woodwork, enabling it to resist the influences of air and moisture, and it protected metal from rust. A good discussion followed. Delegates to the Annual Congress gave a report of the proceedings of the Congress.

At a meeting on October 27th, which was attended by 10 members, Mr. J. F. Furns read a paper, "Possibilities of Reducing Costs of Production." He said it was difficult to see how costs of production could be reduced except by increased production per acre and more efficient farming practices. He stressed the importance of every farmer conducting some method of bookkeeping to enable him to find out which lines were paying best. To make the best use of their holdings they must go in for mixed farming. Sheep were a valuable asset. They cleaned up the fallow and weeds and fertilised the soil. A short discussion followed.

Meeting held November 25th. Present: Seven members. Mr. T. F. Orrock read a paper on the use of fodders, in which he said farmers in their portion of the State were, unfortunately, still experiencing an abnormal run of bad seasons, and would have to make the utmost use of limited fodder supplies. Every farmer should make provision to the best of his ability to conserve as much "cocky chaff" as possible. From experiences of last season, he found that all chaff and straw that went through a header was of considerable value. Stock preferred the rougher straw to the chaff. To get the most use from that rough type of feed it paid to damp it, and a little molasses would make it more palatable. The best method to make wheaten chaff go further was to add corn, and for that purpose he preferred pollard. However, as they had to consider also the cheapest method of feeding corn, crushed grain would be cheaper and almost as good. If it was not convenient to crush the grain, the best method was to thoroughly soften the grain by soaking it. It could then be used with the dampened chaff and would be less likely to cause sickness in stock. Barley could also be used in the same way. If it were well soaked that would lessen the danger of having it growing all over the fields. Most members had cut a little hay, and he thought it would be a good idea to include a small ration of hay occasionally—at regular times—to help keep the horses in better health. For conserving fodder when seasons returned to normal rainfall, he advocated, in addition to cutting a stack of hay, cutting a stack which could be headed for grain, and would provide a stack of valuable straw. Cocky chaff should also be saved. During the next year, or so soon as one could afford the time and labor, he advised making a pit for ensilage. A pit 66ft. x 21ft. x 6ft. deep would hold about 100 tons. The method had proved quite successful, and all realised the value even one such pit would be in times such as they were now experiencing. An excellent discussion followed. Mr. J. Burns did not believe in damping the feed, but preferred feeding dry and mixing whole wheat into the feed. When using cocky chaff or straw only, he added wheat at the rate of ½ bush. per feed for eight horses. His team did all the work on that ration and held their condition. He considered that it was by far the cheapest method of feeding a team. Mr. G. Gregurke always used a fair amount of molasses when feeding cocky chaff or straw to horses, mixing a little pollard with it in preference to wheat. Mr. J. Crocker preferred feeding either oats or bran with cocky chaff undamped. He considered that chaff carriers should never be taken off the harvesters even in years of plenty, because they served a twofold purpose, saving fodder and gathering weed seeds. Mr. L. Jasper favored the stripper instead of the harvester during lean years, because more cocky chaff was gathered and it was of a better quality than harvester or header chaff. For several years he had fed mostly straw and cocky chaff, and had found boiled wheat suitable for mixing with it, though it should not be fed sour. Mr. E. Rooke preferred feeding, where possible, hay chaff in conjunction with cocky chaff, mixing it with molasses diluted in water and adding either half each of bran and pollard, or else crushed wheat at the rate of one-third of a kerosene tin per feed for 12 horses. When feeding



on cocky chaff only, he used boiled wheat at the rate of one kerosene tin per 12 horses daily, chaff allowance being a wheat bag full per horse per day. If the chaff was of reasonable quality, the horse did well on that ration. (Secretary, Mr. E. Roeka.)

#### WILMINGTON (Average annual rainfall, 17.63in.).

On September 23rd Mr. C. Goddard, of the School of Mines, gave a wool classing demonstration in Mr. H. Hampel's shearing shed. In the evening Mr. Goddard spoke on the subject, "Sheep and Wool for the Farmer." Present: 27 members. (Secretary, Mr. H. Stevens, Terka.)

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

##### EVERARD EAST.

The monthly meeting was held on September 6th. There was an attendance of 13 members. A paper was read by Mr. A. Hentschke on cultivation of fallow and stubble land. In the discussion members were of the opinion that in their district fallow should only be harrowed after summer rains, and that nothing was gained by cultivating weed-free dry stubble before sowing.

At a further meeting held on October 8th there was an attendance of 10 members. Mr. C. Hughes gave a report of the Annual Congress. (Secretary, Mr. F. Hughes, Blyth.)

##### GLADSTONE (Average annual rainfall, 16.40in.).

At the meeting of the Branch held on September 19th Rev. Geddes White delivered an instructive address, illustrated with lantern slides, "The Nile of Australia." (Secretary, Mr. F. Chick.)

##### KOOLUNGA (Average annual rainfall, 15.52in.).

Mr. H. Spencer presided over an attendance of 12 members. An interesting report of the Annual Congress was given by Mr. G. Pedler. (Secretary, Mr. E. LePage.)

#### MURRAYTOWN.

August 9th, 1930.—Present: 13 members.

**ECONOMY ON THE FARM.**—Mr. F. Borgas read the following paper:—"With the present low prices of farm products, the farmer has to practise economy wherever possible. *Farm Machinery.*—Where the ground is not too rough and hilly, large machines should be used. The work can be done in less time, wages are reduced, and there will be very little difference in the upkeep than of a smaller machine. On small holdings the farmer has to study economy in the way of conservation of fodder for stock, because he generally sows and reaps as much land as possible to be able to pay expenses and make a little profit. Most farmers only cut enough hay to see them through the year, and when drought years are experienced are short of hay before the end of the year. Every farmer should have a cocky chaff carrier on his machine when reaping. If one has a few good heaps of cocky chaff as a stand-by, it will save much worry and expense when feeding stock in dry periods. One or two good straw stacks should also be made. They are good feed and provide shelter for stock in winter. I do not favor tipping the cocky chaff in small heaps about the paddock when reaping. If the chaff is dropped at one corner of the piece or wherever the wheat heap is made, it can always be made into a large heap and the quantity spoilt in case of rain before carting is commenced will be reduced to a minimum. A well equipped blacksmith shop is also necessary. No matter how careful one may be, breakages occur, and if the farmer has a blacksmith shop he can do most repairs promptly and satisfactorily. In this way much expense and valuable time will be saved; but he should not undertake jobs that he is not capable of doing. The saddler's account can be reduced if a side of leather and a few copper rivets are kept on hand for repairing leather work. All leather harness should be oiled or greased at least once or twice a year. This will preserve the leather when it is exposed to the weather. Neatsfoot oil is a good leather softener, but is rather expensive. Crank case oil drained from cars or tractors has the desired effect and is not so expensive. Super bags should be thrown in a water hole soon after seeding, and allowed to soak for a few days. They should then be hung up to dry, when they can be used for oats, barley, and seed wheat. Old galvanized tanks should be cemented inside and outside, and they will still be of considerable service. A few sheep are also very profitable on the farm. They supply the house with mutton



and help to pay the bills with wool and skins. It will be more profitable if farmers keep a few good cows, instead of a herd of wasters. Pigs should also be kept in conjunction with dairying. Many farmers do not realise the full value of pigs, and it is surprising that such a few farmers keep pigs. They help to provide the house with ham, bacon, lard, and sausages, and convert second-grade wheat and other waste into profit. Most farmers make a practice of selling all the grain they produce, even when the price obtained for it is below production costs. It will be more profitable to dispose of some of the wheat in the form of fat pork. A few fowls can also be kept on the farm. They keep the house in eggs and help to reduce the store account. A circular saw and bench should also be kept handy to the engine; two men can then saw enough wood in half a day to keep the house going for 12 months. A saving can also be effected by devoting a small piece of land to a vegetable and fruit garden, providing sufficient water and time to attend to it are available. It is also necessary for those in charge of the domestic duties of the farm to study and exercise economy.

A further meeting was held on August 28th, when Mr. J. O. Hatter, District Dairy Instructor, gave an address, "Profitable Dairy Farming." (Secretary, Mr. E. Pitman.)

The Hon. Secretary, Mr. E. Pitman, gave a *resume* of the 41st Annual Congress at the meeting held on October 4th. Present: six members.

#### REDHILL (Average annual rainfall, 16.63in.).

At a meeting held on October 7th, attended by nine members, Mr. M. M. Coffey delivered an address, "Our Present Position as Primary Producers," and a discussion followed.

The meeting held on February 3rd was devoted to harvest reports. Each of the seven members present gave a report on his harvest. (Secretary, Mr. S. Pengilly.)

#### YANDIAH.

Eighteen members attended the meeting held on September 12th, when Mr. E. L. Orchard (District Agricultural Instructor) delivered an address, "Fodder Growing and Conservation." (Secretary, Mr. F. Jettner.)

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## LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

### ALMA.

Meeting held September 9th. Present: 12 members. Mr. W. C. Johnston (District Agricultural Instructor) delivered an address, "Weeds and their Control." (Secretary, Mr. E. Drescher.)

The Annual Meeting was held on August 5th. The annual report was received and discussed. Present: nine members.

### BUCHANAN.

Fourteen members and two visitors attended the meeting held on October 3rd, when the Secretary, Mr. L. Bell (Marrabel) gave a report of the Annual Congress.

CLARE (Average annual rainfall, 24.61in.).

September 2nd.—Present: 23 members.

Short papers were read by junior high school members on the subjects: "Lucerne Growing," by E. O'Shaughnessy; "Summer Fodders," by L. Gilchrist; "Top Dressing," by T. Gill; and a milk testing demonstration by L. Walker and R. Smith. All were well received and freely discussed.

At a meeting held on October 7th, with an attendance of 21 members, Messrs. J. Seales and H. Hicks gave a short report of the Annual Congress. Mr. J. B. Harris (Horticultural Instructor) delivered an address, "The Codlin Moth." Many questions were answered by Mr. Harris, and a good discussion followed.

A further meeting was held on October 28th, with an attendance of 18 members. Messrs. C. Neate and P. H. Quirke gave papers on "Cincturing."

Mr. C. Neate in his paper stated that before "cincturing," or "ringing," as the operation was more commonly known, the growing of the Zante currant was not a payable proposition. The setting of the fruit was light and the bunches most irregular. The practice was introduced by the late Mr. W. G. Grasby, after his trip to Europe, and was carried out on the arms instead of on the trunk as at present. The object of "cincturing" was to cause the berries or grapes to set more evenly, and this was brought about by checking the flow of elaborated sap back to the roots. The best time to carry out the operation was when about 50 per cent. of the caps had fallen from the flowers; the best setting and sample he had noticed was on the vines cinctured last, and now he was going to commence even later, that is when more than 50 per cent. of the caps had fallen. He drew attention to the fact that last year the bees had forced a large percentage of the caps off and he had started on three rows, and then stopped. The three rows cinctured early had irregular bunches and a poor sample. The speaker stated that a large percentage of the vines were over-cinctured, and this was the cause of poor growth; in some cases where his vines had been attacked by black spot in the wound, he had not cinctured for three years. Last year he had left the vines on sandy ground, and the returns were heavier and the samples better. These points went to show that the vine had to be studied according to the growth it was making and the seasonal conditions. The implements or tools which might be used were confined to two types, that of a piece of hoopiron made into the form of a saw, and the double knife. It was recommended to only use the saw on vines, say, 15 years and over, while the knife was the more suitable for younger vines. A clean cut one-sixteenth inch in width was best. The operation must be conducted most carefully. Many of the patent ringers were more suitable for the gum trees than vines. On examination of the older vines it would be found that the wound had healed only three-quarters of the way, or was only living by a few strips—these had been let go, and after a few years had regained their strength. The cincturing should be kept as low as possible on the trunk to obtain as uniform a stem as possible; occasionally on a high trellis there was not enough foliage to shade the stem, and the bark in the sun did not heal, mostly on the west side. Under these conditions, the cincture could be made higher up. In conclusion, Mr. Neate stressed the facts that the operation should be carried out with great care, and one should not be in too great a hurry to commence the work. The following paper was given by Mr. P. H. Quirke:—"Cincturing": Among the varieties of grape vines there are two which differ in many respects from the others. These are the "Zante Currants" of commerce, and the "Sultana." Both varieties are seedless, and in much demand in their dried form. In order that payable returns may be obtained from vineyards planted with these vines, it has been found necessary to adopt artificial means of setting the fruit at the time of blossoming. The method used is referred to as "cincturing," or as it is more commonly called, "ringing." Cincturing consists of removing a strip of bark from the main stem of the vine. The strip of



bark removed varies in width according to the vigor of the vine, but usually does not exceed one-eighth of an inch, and in most districts is not nearly so severe. The variations are referred to as "heavy" and "light" cincturing. The ring of bark is taken out so as to completely encircle the main stem of the vine. Currant vines, and to a lesser degree, the Sultana, will throw off the majority of the berries on the vine unless the vine is cinctured, and the fruit from an uncinctured vine is usually small, and the bunch of fruit straggly in appearance. The time to cincture is when the flowers are from half to two-thirds open. There is a difference of opinion among growers as to the correct time, but careful testing has shown that it can be done too early and too late, and the half-way line undoubtedly gives the best results. The young vine should be cinctured for the first time on the oldest wood close to the ground. The reason for this can be clearly seen when it is remembered that the cincture heals downwards, and during the time that the sap is retained above the cincture, considerable expansion takes place in the stem of the vine, and cincturing for the first few years close to the ground gives the vine a sturdy stem to carry the weight of fruit. Do not cincture the young wood unless absolutely necessary, the reason being that until the vine is eight or nine years old there is very little of the hard wood core in the stem of the vine, and unless extreme care is exercised, irreparable damage can be done to the young vine. When the vine is about nine or ten years old, the cincture can be made in a more convenient position, but it is advisable to always cincture under last year's cut, commonly referred to as "ringing downwards." Opinion is divided on this question, but when the question of healing comes into consideration, and it is remembered that the sap is retained above the cut and heals downwards, it will be understood that a badly healed cincture of last year can be covered over by the expansion of the vine above the cut. When treating a badly healed cincture, always make the cut at least 3 in. under the old scar, because the bark under a bad cincture is very thin close to the scar, and the damage can easily be increased by tearing. The tools most commonly in use are the single knife, saw, and double knife, with numerous other more or less effective instruments, nearly all of which have been designed to speed up a tedious and very tiring practice. The single knife is used on the young vine for the first cincture, which consists of two single cuts about 1 in. apart. This practice, besides being almost entirely ineffective on vigorous young vines, can be positively murderous when done by careless hands. The slightest pressure forces the knife into the sapwood, and excessive "gumming" will be noticed, denoting a supreme effort on the part of the vine to repair the damage. Vines have been known to die off above the cut so great has been the damage. Another point against it is if the knife should be tilted when making the cut, it will lift the bark. It needs very little thought to arrive at the result of this damage. The saw is the cincturing medium used by the majority of growers in the Clare district, and I say here from observation and practice, that no more devastating tool has ever been used to gain growers a livelihood. I readily admit that there are many old vineyards where no other tool can do the same work in so short a time, but in too many instances vines are being sacrificed on the altar of speed. The saw cut is certainly effective in setting the crop, but it is doing more to cut short the lives of vineyards than all the diseases in the currant growers' calendar. If the saw is used to cincture the bark only, no great harm can result; but the damage is done by the heavy hand that restricts the ascending as well as the descending sap. "Heavier" and "light" cincturing is interpreted by the depth and not by the width of the cincture. The double knife, which takes out a strip of bark in one clean cut, is the tool which, in my opinion, does the most satisfactory work and compensates for the lack of speed. The double knife was in common use before misguided genius introduced the saw, the main qualification of which is speed, and in the best interests of the currant industry the saw should be relegated to the limbo of forgotten things, the exception being old vineyards that have knotty and gnarled vines, and even in these vineyards a single-bladed knife in conjunction with the double blade will do much to overcome the obstacles met with. A clean cut will always heal better than a ragged one, as is proved in tree pruning, when a larger cut is made with the saw. If the cut is smoothed around the bark with a sharp knife, the wound will heal over much more rapidly than the bruised surface left by the saw. The vine is a very hardy example of plant life, but abuse of the practice of cincturing will sap its vitality, and soon render it unproductive and profitless. In these times when quality counts, it is necessary to study the currant industry from every angle, and everything that will improve our product should be carefully considered, and I am confident that cincturing plays a big part. Without the cincturing, the currant vine is useless, and the practice made the industry possible, and is therefore all-important, and worthy of the greatest care in application. Many questions were asked and experiences related. Mr. E. H. Mattner spoke of the use he had made of topping where he had to cover large



areas, and was "running late." He had just taken off the tip of the shoots, not a large amount, with a knife, the topping had checked the vines enough to permit of the cincturing being carried out carefully, which he had found very essential. In some cases a second cincture had been carried out, but members suggested that the tipping or lightly topping the shoots would be worth while trying. Mr. L. Dux drew attention to the fact that many growers became too excited about cincturing, and as soon as the caps commenced to fall they were anxious to start. He said it was better to let all the caps fall than to worry about not being finished in time. He had found that he had the best results where the cincturing was carried out on the vines with the caps off.

Meeting held December 2nd. Present: 13 members. A short report of the Conference at Angaston was given by Mr. H. Lawrence. Mr. J. O. Hatter (District Dairy Instructor) delivered an address on dairying. (Secretary, Mr. H. Ninnes.)

## MIXED FARMING IN THE LOWER NORTH.

[A paper read by Mr. G. BUCKBY (*Wasleys*) at the *Lyndoch Conference, February 26th.*]

To conduct a mixed farm successfully, it is essential that all sections of the industry must be made to pay individually. The main items in our district are hay and wheat, and to get the best results from these crops, you must fallow the land as early as possible. June and July is the best time for winter fallow, and gives a far better chance of getting a good seed bed, especially in dry years. Fallow should always be worked well to keep weeds down and to prevent a crust from forming on the surface. It is very important that fallow should be worked after every rain, particularly after summer rains. When the fallow has been thoroughly prepared, select nothing but the choicest and purest of seed wheats, at the same time taking into consideration their suitability for the district. For best results, all oats or wheat should be sown not later than the month of May in the Wasleys district; later sowing nearly always shows a great reduction in yields, both for hay and wheat, and has done so for over 50 years. Mulching or Cape barley sown in June usually yields well, and would be too rank sown earlier. With regard to sowing of superphosphate, I strongly advise farmers never to sow less than 1cwt. of super to the acre with any crop. When the crop is ready, cut for hay or reap for corn, whichever pays the better, according to prices and yields; but, nine times out of ten, hay pays better than wheat in the Wasleys district, if one sells on the right market. Barley is not always payable with regard to price, but is very valuable for crop rotation. It is a crop that can always be reaped and obviate the necessity for cutting large quantities of hay, as in the case of oats as a change crop. Oats are the most essential and efficient change crop for building up the soil for wheat growing in our district. If we sow wheat on the same land two years in succession, yields are definitely lower in the second wheat crop, and the difference in the crop can be seen right throughout the year. Indian Runner wheat is almost as good as an oat crop in its soil-building qualities, but it is a hay wheat and does not, on the average, yield satisfactorily as a corn crop.

*Dairying.*—The industry which holds second place on a mixed farm is dairying, combined with pig raising. The cow is a very profitable and productive animal if fed well and managed properly. A cow must have adequate shelter in winter from cold, bleak winds, or she will become unproductive, even with the best feeding. The cream produced is either made into butter or the cream sent to the factory, the by-product in the form of separator milk can greatly assist in the feeding of pigs and saves feeding so much corn to them, which usually is of greater value than separator milk. Milk is essential for sows with young pigs and they will not thrive satisfactorily without it. To cut down costs of pig raising, it is absolutely necessary that there should be small paddocks adjacent to the piggeries, these paddocks to be sown with Cape barley or lucerne. The green feed paddocks can be fed off in rotation and save a good deal of corn feeding. Green feed materially improves the health of the pig, as also does the exercise and freedom gained in the paddocks. Generally, the most profitable age at which to sell young pigs is from six to 10 weeks whenever possible. I do not favor the keeping of pigs to be large enough for bacon, unless the necessary foodstuffs are very cheap at the time and the marketable prices very low. The sow can be very cheaply reared if natural feed is plentiful. If every heifer calf is reared, a herd of young cows can be soon built up at very little cost, and the older animals can be profitably sold when the young cows come into profit. In any case, the cow is an absolute necessity on the farm, even if only kept for home requirements—fresh milk and butter.



**Sheep.**—Sheep are an excellent side line on a farm to utilise feed that would be otherwise wasted, and in the farm sheep one has far cheaper meat than buying it from the butcher, provided good judgment is exercised in buying and selling of the farm flock. The sheep is very similar to the cow in that its numbers can soon be doubled if success is achieved with lamb raising. Wool usually is a fair price, and is one of Australia's greatest wealth producing industries. The rearing of young horses will become a very lucrative branch of the farming industry, because there have not been so many young horses reared the last few years as previously, and tractors are wearing out and being replaced by horses in many parts of this State. These facts will tend to greatly increase the price of the good stamp of farm horse.

**Gardening.**—Gardening is a very profitable side line which should be carried on by everyone who has a house and a little land around it. Various kinds of fruit trees and vines should be planted for usefulness and to beautify the home. Nearly every kind of vegetable can be grown here, and can be planted in rows underneath the fruit trees. At least three crops a year can be grown on the same ground if heavily dressed with farmyard manure and properly worked to keep a rich, deep loam. Much money can be saved if a farmer grows all his own vegetables, and more vegetables can be used if grown in the home garden, because of the cheapness. The time required is very little to maintain a small home garden on a farm, and efforts in this direction will be amply repaid. A lawn and flower garden assist in beautifying the front of the home, and cost very little, but they improve the value of a home wonderfully.

**Poultry.**—Geese, fowls, turkeys, ducks, and pigeons are a very good assistance towards making mixed farming pay. All poultry sells well throughout the year, and especially during the festive seasons. The income from eggs greatly assists in making things pay, and for many months of the year poultry live on corn about the farm that would otherwise be wasted. Chicken raising can be carried on to advantage if managed properly. Lucerne is a very valuable food for poultry and is almost a necessity. I maintain that the farmer who carries on mixed farming thoroughly will be in a better position always than the man who just grows hay and wheat and perhaps keeps a few sheep. The mixed farmer can pay all his small debts throughout the year from his side line income, and in many cases has all his harvest money to bank at interest, provided he is not buying ridiculously expensive land.

#### FARRELL'S FLAT.

Meeting held September 26th. Present: 15 members. The Secretary, Mr. A. Brown, addressed the meeting on the subject, "The Value of the Department of Agriculture and the Agricultural Bureau."

#### LYNDOCH (Average annual rainfall, 23.58in.).

Meeting held October 7th. Present: 19 members. Matters of local interest were discussed.

At a meeting held on December 2nd, which was attended by 13 members, Mr. H. Kennedy gave a brief report of the proceedings of the Conference at Angaston.

Twenty-three members attended a meeting on January 6th, when matters in connection with the Lower North Conference were discussed.

A meeting held on February 3rd, with an attendance of 16 members was devoted to the same subject. (Secretary, Mr. J. Hammat, Williamstown.)

#### MODBURY.

Fourteen members attended the meeting held on September 12th, when Mr. A. Edquist, of the Education Department, gave a milk testing demonstration. (Secretary, Mr. M. Murphy.)

#### OWEN.

Meeting held September 29th. Present: 10 members. Delegates tendered reports of the Annual Congress and papers referring to the world's position of wheat and wheatgrowing were read and discussed. (Secretary, Mr. A. Bowyer.)

#### PENWORTHAM.

The meeting was held at Seven Hills and was attended by 22 members. Mr. J. B. Harris (District Horticultural Instructor) gave an address, "General Orchard Work." (Secretary, Mr. A. Jenner.)

#### RIVERTON (Average annual rainfall, 20.81in.).

Meeting held October 6th. Present: six members. The meeting took the form of a Question Box evening. Several subjects were brought forward, and an interesting discussion followed. (Secretary, Mr. O. Longbottom.)



## ROSEDALE.

Meeting held September 9th. Present: 11 members and two visitors. Mr. F. Waddy (Manager Turretfield Demonstration Farm) delivered an address, "Topics of the Day." (Secretary, Mr. H. Muegge, Sandy Creek.)

## SADDLEWORTH (Average annual rainfall, 19.65in.).

September 5th.—Present: 12 members and three visitors.

CONSERVATION OF TREES.—Reading a paper on this subject, Mr. G. Friebe said it was a matter for regret that with the large number of trees that were being cut down right through the country districts, very little was being done in the way of replanting. Those engaged in the bee-keeping industry had already drawn attention to the harm that was likely to be done to the export trade in honey as a result of the cutting down of trees. It was admitted that on arable land trees had to give way to the cultivation of cereal and other crops, but on rough, hilly country, trees were too often ringbarked solely for the purpose of growing grass. He urged farmers to give serious consideration to the planting of trees on their properties. They would provide a source of revenue for the beekeeper, give much needed shelter to stock in summer and winter, and furnish posts and firewood for the farm. Mr. L. J. Burton read a paper, "The Wife's Right to Pledge her Husband's Credit." (Secretary, Mr. A. Blundell.)

## TRURO (Average annual rainfall, 20.21in.)

September 8th.—Present: 14 members.

SHEEP AND WOOL.—Mr. W. Scott read the following paper:—"The most profitable sheep to be kept in this district is the Merino, and for the purpose of wool-growing alone this breed stands above all others, especially so in dry districts. This district is also very suitable for fat lamb raising, and should prove very profitable to farmers who keep 100 to 200 sheep. In raising fat lambs, a crossbred would be the most profitable. Quicker returns are secured by using a large-framed Merino ewe (three or four years old) with a Dorset Horn, Shropshire, or South Down ram. A point in fat lamb raising is to get the lambs to market in a nice fresh condition. Wool growing and fat lambs are the two industries which should prove the most profitable in this district. All the sheep should be of good constitution and entirely suited to the district. There are many things the sheepowner should try and avoid, perhaps the most important is overstocking, as no one can expect to get the most out of the sheep if they are half starved. It is far better to be on the safe side and always try and keep a little feed in the paddocks, then if a drought does come the sheep should be in good condition. Anyone knows that in bad times poor and half-starved sheep are not of much value. Dealing should also be avoided; a farmer loses far too much valuable time in attending markets when he starts dealing, and very often shows very little profit after wasting much time. It is a much better proposition to have a permanent flock than to be always buying and selling. The best time for lambs is about April-May, and that means joining the rams with the ewes in the middle of November. When joining the rams the ewes should be in good condition, but not too fat, and on very good feed if possible. The ram should be in strong, vigorous condition, but when using other than Merino it is very easy to have them too fat. Three rams should be joined with 100 ewes and left for six to eight weeks, and it is a good plan to yard them occasionally. About a month before lambing ewes should be crutched. If breeding crossbred lambs, the ewes need more attention at lambing time and should be watched closely, otherwise ewes as well as lambs may be lost. Young ewes have trouble in lambing to the bigger framed rams. Lambs should be tailed at about four to six weeks old. I have always used the searing iron, and consider it the better way; when the tails are cut off the lambs lose a considerable amount of blood, which checks their growth for a time. Instruments used in tailing and ear marking should be disinfected—a solution of 5 per cent. ordinary washing soda used hot is quite a good disinfectant. Shearing, where possible, should be done about the same time each year. A couple of weeks before shearing all sheep should be got in and all dirty and draggy ones crutched. Branding should always be done neatly, and the brand always put on the right place. A line of sheep well branded in a sale yard are much more attractive to a buyer. The correct time for dipping is about six weeks after shearing. Wool.—Good wool should show plenty of character, it should possess a good even crimp, and be well developed, which indicates good breeding. Condition also pays an important part in wool classing. This refers to the state of wool, whether it has grease or yolk in it. This wool is termed heavy condition, while wool with little or no grease is termed light condition. Wool classing at all times should be done honestly and carefully, the fleeces should be well skirted, very burry or dirty pieces should be taken off and fleeces generally should be skirted as evenly as possible,



and good judgment and care is essential. In classing the fleeces all the yellow, heavy-conditioned fleeces should be taken out and baled separately, also all very coarse and short stapled and tender fleeces should be taken out. With farmers, where it is only advisable to have two classes, all of these just mentioned could be baled together, and where there are enough sheep, all of the ewes' hoggets', and wethers' fleeces should be baled and branded separately. If possible make the lots in four or more bales. Lots of under four bales—"star lots"—do not receive the same amount of competition as do the bigger lots. Pieces should also be in two sorts—first pieces and second pieces. The first consists of all the bigger and cleaner wool, and the second of trimmings and dirty edges of the bigger pieces. Stained wool should be kept out and packed in a bag, and pizzle pieces should always be taken out of the wethers' bellies. Bellies also have to be baled separately. Floor and table locks are baled together. Very sandy locks should always be taken out. All first fleeces should consist of all the bright, light, and most attractive fleeces, while the seconds are made up of all yellow, short, and tender fleeces, and in bigger clips another class should be made of all the stronger quality fleeces which may be very light, but it does not pay to put very strong, coarse wool in with the best fleeces when the flock consists of, say, 1,000 or more sheep. Lambs' wool should also be baled in two lots—first or A lambs in small clips, or AA in larger clips, should be the longest and brightest wool, and the second class all the duller and shorter wool. A bale must weigh over 250lbs., but should not exceed 360lbs. A good average weight is about 320lbs. to 330lbs. All bales should be numbered and branded across the top and on the front side. The larger the number of fibres to the area of a sheep's body, the greater the density of the wool."

October 13th.—Present: 19 members.

**FALLOW CULTIVATION.**—Mr. J. Schilling read the following paper:—Cultivation of the fallow is one of the most important jobs on the farm. The land should be worked well the first time of cultivating, this being done before summer while the soil is moist, thus minimising take-all. If fallow is not worked well the first time, a good crop can very seldom be expected; it is not necessary to work the ground deeply after the first cultivation. The fallow should be kept clean and free from weeds and fairly loose during the summer months so that air can penetrate the soil. It always pays to work the fallow several times during the year; since we adopted this method we have always had good

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results. We tried a few acres the first year and could see the difference at harvest time in the crop, it being thicker, higher, with longer heads and better grain than that which had only been cultivated once or twice. Fallow should be cultivated again at least a month before seeding to allow the soil to set again. It is not a good plan to start seeding immediately after cultivating, because the ground generally is worked down too fine. At the present time, farmers mostly use combines for seeding and it makes a perfect job of cultivating when the fallow is loose, but the most suitable implements are the scarifier or spring-tine cultivator when the ground is hard or cultivating the first time after ploughing. When there are troublesome weeds to contend with, a scarifier is not good enough; the weeds are dragged over the paddocks and again take root. The skim plough has proved a good implement to kill sorrel and other weeds, but is no good for working fallow the first time. Another suitable implement for cultivating is the disc cultivator, it being just as good as a scarifier or spring-tine cultivator, and it does not leave a wheel track on the worked ground. The disc cultivator does not leave the ground too rough nor too fine; it kills weeds and will go through any thick rubbish, but it does not do good work in sticky ground when it is wet. During the discussion on the paper, Mr. Johnston stated that aeration of the ground was a most important factor in fallow cultivation. Take-all was encouraged by not having a solid seed bed. He favored the rigid or stump-jump to spring-tine or disc implements. One should not work red ground too finely on account of its running together. Fallow should be cultivated a couple of times about October, then in the summer if weeds were present, and again after the first seeding rains. To eradicate sorrel, apply 6cwts. to 8cwts. of lime to the acre immediately after the first ploughing; spread it on top of the ground, but do not work it in. Spray sour sobs with sodium chlorate if in small patches only.

The annual meeting was held on January 12th, there being present 12 members. The Hon. Secretary (Mr. L. Davis) presented the annual report, and officers were elected for the ensuing year.

#### TWO WELLS (Average annual rainfall, 15.88in.).

The annual meeting of the Branch was held on September 4th, and was attended by 20 members and about 120 visitors. Mr. C. G. Lewis gave an address illustrated with lantern slides, "The Coral Islands and Marine Gardens of the Great Barrier Reef." Elocutionary and vocal items were rendered. (Secretary, Mr. M. Pratt.)

#### WASLEYS.

September 11th, 1930.—Present: 45 members.

**ANIMAL, BIRD, AND INSECT PESTS.**—In the course of an address on this subject, Mr. V. Day said that animals such as foxes and rabbits had been imported for sporting purposes, but were now a pest to farmers. He did not favor poisoning either of these pests, because there was a danger of the dead carcasses being picked up and chewed by cattle, which would probably result in the loss of the animals. He considered hunting the fox the best means of destruction, and ferrets to hunt the rabbits from their warrens. Skins and carcasses were valuable, and repaid trapping or hunting. Rats, he considered, were the worst of animal plagues, and to destroy them either gas, tar, or hot water poured into their haunts was the cheapest method of destruction. Speaking of bird pests, he considered that many of the protected birds were a worse pest than the unprotected. Quails should be saved from slaughter, because they destroyed weed seeds. Hawks, eagles, crows, &c., cleaned up much of the waste matter from ewes after lambing and destroyed the maggots of the blowfly. Those birds were blamed very often for killing lambs, but he assured members that they would not touch a lamb while life existed. Magpies he considered a nuisance to the poultry yard. They killed chickens, and if they commenced taking eggs, were worse than crows. Sparrows could be destroyed with poison wheat prior to seeding. Speaking of insect pests, he said sheep affected with lice should be dipped. Blowflies should be kept down by burying or burning all dead animals, the carcasses of which were a breeding place for flies. Sheep should be inspected occasionally and crutched if required, and if fly blown, turpentine 1 part, mixed with 2 parts of medium body oil, applied. Merinos were particularly needful of attention owing to the density of the wool. The bot fly was a pest and troublesome to horse teams. A little oil of turpentine should be applied to places where flies struck. For the following insect pests, Mr. Day suggested:—Horse louse, turpentine and oil to affected parts; fowl tick, dip fowls or put oil on perches; fleas, applications of turps and oil; weevil, reap grain when properly ripe. Common fly should be caught by flypaper, &c. In the discussion, Mr. E. Day considered the fox a bad pest, but it was often blamed for damage done by stray dogs, and that a more strict enforcement of the Registration of Dogs Act would assist in combating these



nuisances. Foxes did destroy plovers, curlews, and quail, which were friends of the farmer. The latter destroyed night insects and consumed weed seeds. Boys should be encouraged to gather sparrow eggs. Magpies were great insect catchers, and he did not consider them a pest. For blowfly maggots he used petrol; although severe at first, it was very effective, and the severity of it soon passed off. For poultry lice, before setting the birds, lime should be sprinkled in the nest, and the bird with insect powder. Mr. E. Fischer said that the best method to destroy foxes was to place two eggs out side by side, strychnine treated; but care should be taken not to handle them with the hand. By this method the chance of the fox getting away with both eggs was negligible. (Secretary, Mr. C. Currie.)

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD (Average annual rainfall, 15.52in.).

A meeting on September 4th was attended by 21 members and visitors. Mr. J. Boundy delivered an address, "Power Farming v. Horses." A discussion followed, in which the majority of members were of the opinion that horses must again come into favor.

A further meeting was held on September 30th, with an attendance of 24 members and visitors. The subject was an address by Mr. R. Hill (District Agricultural Instructor), "Conservation of Fodders."

Twenty members and visitors were present at a meeting on October 29th. Mr. H. B. Barlow (Chief Dairy Instructor) addressed the meeting on dairying matters and replied to numerous questions. (Secretary, Mr. G. Tucker.)

## WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

September 3rd.—Present: 13 members.

Mr. J. A. Elleway read a paper, "Advantages of Power Farming." He had been power farming for five years. He said horses had to be fed 365 days a year whether they were working or not. It was not always convenient for the farmer to have a good supply of surplus hay on hand, and he was very often unexpectedly faced with a drought. The tractor eliminated much of the drudgery attached to farming; the cleaning out of stables, grooming, and harnessing of horses was dispensed with. During rush periods there was no changing of teams and no need to wait because it was too hot for the horses to work. The farmer had to keep the best of his grass paddocks for his horses. If horses were not used, the land could be put to more productive uses, such as for cows or for grazing sheep. His tractor expenses over a period of five years had not amounted to more than £25 or £30, including the cost of two sets of lugs. During the past five years, if he had been working horses, he would have been carting water for months. However, because he had a tractor, he had been able to put all his spare time into improving the farm by such work as fencing, stone picking, &c. If a tractor were overhauled about twice a year a breakdown would seldom occur. He had never experienced one since having a tractor. The life of the machine depended mainly on the operator and the size of the implements it pulled. In some years horses might work more cheaply or as cheaply as a tractor, but he thought that if the average cost were taken over a period of years, the tractor would work out by far the cheaper, on large farms as well as on small ones. In fact, it would be cheaper on the small farm, because the farmer had not enough land to carry a horse team as well as cows and a few sheep. A paper, "Horses v. Tractors," by Mr. R. F. Wake, was also read. A good discussion followed.

At a further meeting on January 7th, which was attended by 11 members and visitors, Mr. Wake delivered an address on his visit to the Waite Agricultural Research Institute. (Secretary, Mr. W. J. Cooper.)

## KAPINNIE.

September 19th.—Present: 19 members.

FENCING.—In the course of a paper on this subject, Mr. D. Green said good fences added to the attractiveness of a holding, and every farmer should have strong fences surrounding his property. A good fence could be made of posts 3in. or 4in. across the top. In that district it was hard to get good timber for posts. Native pine was best, then titree. They were both light posts for carting and easy to bore. The best height for a fence was 3ft. 8in., and it was advisable to get rid of any animals which would not stay inside a fence of that height. In the discussion which followed Mr. Wagner said 3ft. 4in. was high enough for a fence. (Secretary, Mr. E. Wannan.)



KELLY (Average annual rainfall, 11.92in.).

Mr. C. Freeth presided over an attendance of 15 members and six visitors at the meeting on September 6th, which was held at the residence of Mr. J. Guthleben. Crop competitions and other matters of local interest were discussed. (Secretary, Mr. M. Martin, Kimba.)

#### LIPSON.

A meeting on September 27th was attended by eight members and three visitors. Eight members attended a further meeting on November 8th. Matters of local interest were discussed. (Secretary, Mr. M. Barraud.)

#### PALABIE.

The monthly meeting was held on September 4th with an attendance of 11 members. A paper, "Gardening Notes," was read by Mr. H. North, who also replied to several questions on the subject. A paper read by Mr. C. Rashleigh, "Side Lines on the Farm," was fully discussed. Members also took part in a discussion on the value of cows, fowls, and pigs.

Eleven members attended a meeting on October 3rd. Delegates gave a report on the proceedings of the Annual Congress. Mr. E. Rashleigh read a paper, "Horses versus Tractors." He favored horses because they were more economical where they had to be worked for 10 to 12 months of the year. A team of 10 horses was cheaper to buy than a tractor, and the working expenses per acre were practically the same, but with a tractor the feed grown on the farm could be taken as a profit. Sixteen tons of hay would be sufficient fodder on which the team would do the bulk of the work of seeding and fallowing, and the actual cost of the 16 tons worked out at £44 15s.—approximately £3 per ton. The average team would consume one ton per week, which gave 16 weeks working feed. In most years one could get, say, 12 weeks stubble feed, leaving 24 weeks to feed off 200 acres of pasture. That referred to a farm of approximately 1,000 acres, allowing for cropping 500 acres, fallowing 300 acres, and leaving 200 acres for pasture. The writer stated that after five years service the depreciation on a tractor would be approximately 50 per cent. With a 10-horse team in five years one should have a new team ready to start work, whereas with a tractor the farmer would be very fortunate if at the end of five years he did not have to spend more on the tractor than it cost to raise a new team of horses. Another point to consider was that when seeding the drill could be worked close to the fence, and at harvest time the tracks around the fence could be cut to feed the stock, whereas with a tractor it generally ran over the crop which was left on the ground. A lively debate followed Mr. Rashleigh's paper. Several members favored the tractor for quick working, but considered that working cost per acre was lower where horses were used.

A further meeting, in the form of a Question Box, was held on October 31st, with an attendance of 12 members and three visitors.

A meeting was held on December 5th. Ten members and two visitors were present. A paper was read by Mr. H. Luestner. (Secretary, Mr. E. Rashleigh, Wudinna.)

#### MALTEE.

The monthly meeting on September 11th was attended by 14 members and visitors. Mr. A. Edson gave an address on sheep shearing, and a good discussion followed.

"THE ECONOMIC POSITION OF THE PRIMARY PRODUCER" was the subject of a paper by Mr. J. B. Talbot at a meeting on October 2nd; 20 members and visitors were present. Referring to high land values, Mr. Talbot said that, although land in the better rainfall areas had been affected, in the class of country similar to their district, nothing could be laid to that charge, because land values were but very little higher than they were 20 years ago. There was no doubt that the low prices for products had affected the position to a large extent, but only in relation to the high costs of production, because many would remember when both wool and wheat were as low in price, or even lower, than the present, and yet farmers paid their way and had a surplus. The writer was not in favor of the pool system of marketing primary products. He thought that holding wool for high prices had led to the introduction of artificial wool, and, in the case of wheat, had caused the peoples of the world to turn to substitutes. The position could largely be improved by lower costs of production. Lower rail freights and the abolition of wharf and jetty tolls on outward bound products would help a great deal. Increased yields of wool by better fleeces and of wheat by larger yields per acre were two factors which would help to improve the position. However, they were both largely dependent on climatic conditions. There were many lines in which a saving could be made by co-operative buying and selling. By co-operative selling he did not mean the pooling system, but combining and selling in larger parcels, which in most cases brought a higher price than small lots.



A further meeting on October 30th was attended by 15 members and four visitors. The delegates delivered a report of the Annual Congress.

The monthly meeting on November 27th was attended by 15 members and three visitors. Mr. J. Kerin read a paper written by Mr. W. J. Spafford for the Annual Congress. A good discussion followed.

Fourteen members and two visitors were present at the meeting on January 8th. Mr. J. W. Bassham read a paper written by Mr. Fisher, and a discussion took place. (Secretary, Mr. E. Schwarz.)

**MANGALO** (Average annual rainfall, 14in. to 15in.).

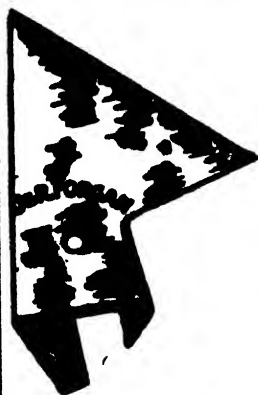
At a meeting held on September 1st Mr. O. Hannemann read an article dealing with the Federal Wheat Marketing Scheme. The question of wheat marketing was discussed by members. (Secretary, Mr. C. Hannemann.)

**MILTALIE** (Average annual rainfall, 13.59in.).

September 6th.—Present: 19 members and four visitors.

**VALUE OF SIDE LINES ON A FARM.**—In a paper on this subject, Mr. D. Bagnell said in latter years with either wheat or wool realising fair to good values the man on the land could generally make a fair to good living, but to-day the burden of excessive rates and taxes, coupled with the high cost of production, such as farm implements and machinery, cornsacks, super, wages, living, &c., compared with the very low prices of wheat and wool, put the landowner in a bad position. There was need for economy, and to do that he thought that side lines would be a step in the right direction. For instance, the farmer who had a large family should be able to put on the market in a presentable way poultry, butter, pork, eggs, &c., in large quantities. Where there was a large family on the holding cows, pigs, fowls, and gardening could bring in quite a big revenue, providing there was a market and transport difficulties were not too great. Where cows were a side line, too many inferior breeds were kept. Inferior cows meant poorer returns and cost just as much for maintenance, therefore it paid to keep a good milking strain. When selling them or their progeny, one could always demand a good price. He considered that in their district the cream can was an

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effective and profitable way of marketing the products. Where there were a number of cows kept, pigs could be raised profitably. They should be sold from six weeks to six months old, it was cheaper to breed them than to keep fully grown pigs. Poultry was a side line which appealed to most. It was easy to run, and that was where a big mistake was made; too little attention was paid to the housing, feeding, and breeding of the birds, and very often less in the gathering and marketing of the eggs. He did not see why one should pay half a guinea to a guinea for a setting of eggs, or £5 per hundred for day-old chicks, when one could do one's own breeding and be a seller instead of a buyer. The housing and feeding of the poultry should not be neglected, and the chicks should be raised to lay in winter months when eggs were dear. Gardening in their district had not proved itself a payable proposition, chiefly due to the lack of irrigation, but an effort should be made to grow enough vegetables for the household. There were other so-called side lines, such as carriers, handy men who went out on odd jobs, contracts, &c., but usually such lines were not altogether payable, because the farmer had to stick to his own farm to get the best returns and should not take on any side lines which would interfere with seeding or harvesting operations, or retard the progress of his farm. A keen discussion followed.

At a meeting held on October 4th there was an attendance of 24 members and four visitors. A paper, "The Value of Barley as a Fodder," was read by Mr. S. McCauley. He said that wheat growing at the present time was not showing the farmer a profit, but, on the other hand, in many cases showed a distinct loss, hence they had to look to other means to help to make up their losses, meet liabilities, interest, wages, &c. If they were to find a solution to their problems he thought it might be found in the production of barley as a fodder. It was not known perhaps as well as it might be that barley as a corn feed was equal to any corn produced in Australia to-day. A lot of people held the idea that it was too heating as a corn feed; that was not so. Barley could be fed even to horses at the rate of 1bush. of pure grain per day without any harm resulting. Half a pound per day would keep a sheep in good, strong condition, and would give a ewe rearing a lamb a good supply of milk. It was also a good milk producer for cows, a good fattener for pigs, producing nice, even bacon, and it was equal to most other grains for feeding fowls. The two varieties he advocated were the four-row Cape barley and the two-row Pryor's malting. He had made a special study of the latter, and had grown it under nearly all conditions. He had grown it as a grain for malting, but their district would not produce a malting quality except under very favorable conditions. On account of the situation and the dry winds during the growing and ripening period, the grain became callous or flinty, and ripened with a brittle or hard shell, which was not suitable for the maltster, though it did not affect the feeding quality to any great extent. The advantage with two-row barley—so far as production was concerned—was its short growing period. It could be sown after the wheat and reaped before the wheat was ripe. He had sown it at the latter end of August and reaped 35bush. to the acre in November. The best crops had been produced from grass land, summer fallowed as late as January. Barley seemed to do remarkably well on that type of cultivation, but would also produce a fair crop from stubble land. Some people were inclined to think that barley impoverished the land and encouraged take-all. The writer had grown it for five years in succession with an average of nine bags to the acre over that period, and followed the last crop by fallow and reaped 30bush. of wheat from the same land the following year. He contended that in their district, where there was a good deal of grazing land mixed with agricultural land, by growing a cheaply produced grain which would grow with a light rainfall, the sheep-carrying capacity could be increased by 50 to 60 per cent.; in fact, there was no reason why by proper and systematic working it could not be increased by 100 per cent. Wool, even at 6d. per pound, was a better paying proposition under present conditions than wheat produced at 3s. per bushel. Storing the barley would perhaps be the biggest problem, because barley seemed to be much harder than wheat to keep free from weevil. The trouble could be overcome by using silos, or a concrete shed, or even by tipping out loose in a shed with a good floor. A certain amount of barley could be cut for hay and fed as chaff, and one would have the double advantage of the chaff as well as the corn. If barley was left fairly late, the corn ripened after binding and made very good chaff; in fact many farmers on Yorke Peninsula were cutting a lot of barley for hay and mixing layers of it through their stacks of oats or wheaten hay on account of the value of the corn, it saving them from corn feeding with the chaff. In the course of the enthusiastic discussion which followed Mr. F. Coles said that the growing of a green fodder, such as barley for sheep feed, and also to produce grain for hand feeding over the lean period, seemed essential in their district. It would stabilize the number of sheep that could be kept on a farm. For feeding off purposes, Mr. W. Smith favored a mixture of half oats and half barley. Mr. J. Jacobs did not think barley would



thrive in the district, and stated that it was a difficult grain to handle. Mr. F. Jacobs advocated barley because it produced a good growth of early feed ahead of most other cereals. It was a fallacy that by growing barley the land became infested with it and interfered with wheat growing, because where stock could get to it barley was rarely known to get ahead. Mr. S. Bagnell found barley the best feed of any cereal. It got away early and stock thrived on the stubble. Mr. Story considered that when fed to sheep it did not affect the quality of the wool. He had known Cape barley to yield up to 40 bush. in their district during wet seasons, but for feeding purposes it was not so good as matting barley.

The monthly meeting held on November 1st was attended by 12 members. A paper, "The Improvement of Our Flocks," was read by Mr. F. Jacobs. He considered that although the price for wool was low and sheep cheap, they were one of the most important lines to look to in a time like the present. Because they were cheap they should not be neglected. There was never a more opportune time to improve flocks than the present owing to the lower prices ruling for high class sheep. To improve the flocks the first necessity was to have a good boundary fence, to see that the sheep had plenty of feed and good, clean water, with free access to salt. To use the best rams one could procure was a very important factor. Money spent on good rams was essential, because without them little or no improvement could be expected. A bad ram would get more mongrels than a good ram would get good sheep. Another way in which flocks could be improved was by clearing the country as much as possible. However, one should not neglect to leave sufficient shade, because without shade the fleece tip became bleached and faded like dead wool. It then opened and let in the dirt and destroyed the life of the whole fleece. By using more super on the land the writer had proved that the fleece would be heavier and the wool stronger. Feed conditions altered the count of the fleece more than most people realized. For instance, a sheep running on good natural grass that had not been cultivated or manured, which carried 64 count wool, when put on to heavily manured land would immediately start to grow a 60 count wool. He had proved that on his own land. Therefore, in selecting rams one should take into consideration the condition of the feed on which the rams had grazed and make allowance accordingly. If paying a big price for a ram he advised buying only on condition that the ram was satisfactory after being shorn, because it was surprising what defects could be hidden with the wool by expert shearing, such as devil's grip, camel humps, goose rump, lop-sided folds, breech wrinkles, hairy breech, and bad tails. If one had good sheep he advised considering well before sending one's best ewe lambs—which were usually the fattest—to the freezers, and then have to keep the culls. Even when using long wool breeds with the idea of rearing lambs for the freezers, they were up against the same trouble of not knowing what to do with the rejects. He advised keeping the large-framed Merino and using plenty of barley and oats and super to provide green fodder and grain. He was sure they could then in ordinary seasons supply quite a lot of good lambs for the freezers. Sheep could run on fodder crops during winter and spring, and later on the stubbles, and be fed with corn and chaff. Even cocky chaff would be quite all right during any time of shortage of sufficient feed in the paddocks to keep the clip growing. He preferred a feeder of any description to throwing feed on to the ground. If intending to feed lambing ewes, it was not advisable to wait until they started lambing, or the results would be very disappointing. During the discussion which followed, Mr. W. Smith said that the present wool prices would entice pastoralists to produce a better quality wool if they expected their business to pay. He favored a fine quality wool—60's to 64's—because the demand was always keen for that class. Mr. G. Smith thought they should strive to increase both the weight of wool per sheep and the sheep carrying capacity of the land. Grazing the flocks on sown pastures over certain periods of the year and spelling other portions of the holding would greatly increase the carrying capacity. (Secretary, Mr. G. Smith, Cowell.)

#### MINNIPA (Average annual rainfall, 14.68in.).

The monthly meeting of the Branch was held on September 11th, and was attended by 10 members. Mr. J. Martin gave a demonstration on poultry keeping. (Secretary, Mr. F. Williams.)

#### MOUNT HOPE.

The monthly meeting was held on September 8th, with an attendance of eight members. Mr. W. Vigar read a paper, "Accessories on the Farm." He said the chaffcutter and engine were important accessories, because although it was possible to get good results from feeding long hay or fodder, chaffing it saved considerable time in feeding, and there was not nearly so much waste as with long fodders. The engine could also be used for pumping water, thereby assuring a supply of water whether



the wind blew or not. Another use for the engine was in sawing a wood supply. A most useful accessory was a well-equipped blacksmith shop. Much time and money would be saved by the farmer who did the farm's general repairing himself. Most farmers could repair minor breakages as well as a professional, and while such work as rettyring a wheel or welding a broken sprocket or cog were jobs for experts, such things as making bolts, eyebolts, C or S hooks, and welding flat or round iron were quite within the capability of the novice. Motor cars and motor cycles were among the most popular accessories to farming to-day. Personally he considered that a motor cycle should be found on every farm, since it combined the qualities of a saddle hack with the speed of a motor car. Moreover, it had the advantage of always being at home when wanted. Perhaps the farmer's most useful accessory was the dairy. Sheep could also come under the same heading from a strictly wheat growing standpoint, for they could turn stubble into revenue. Poultry also assisted the management of the home, but they should not be allowed the full run of the farm. The vegetable garden was also of value. Stable manure was the best manure for the garden, and with plenty of water enough vegetables could be grown by the average farmer to provide for the household requirements.

A meeting was held on October 7th, with five members present. Mr. R. Myers read a paper, "What is the Most Profitable Side Line?" He stated that in these times of high costs and low prices for primary products it was essential for farmers to turn attention to side lines in the hope of augmenting their income. In view of the fact that Eyre Peninsula had its freezing works already established, the time was opportune for raising fat lambs. Farmers, most of whom were still resident on the Peninsula, had about £38,000 invested in those works, for which they were getting no interest, and if the works could be put into profitable operation it would be a great relief to Eyre Peninsula, not only to the farming community, but also to the pastoralist, who would have a ready sale for surplus breeding ewes. To achieve the desired effect, some organising work was necessary, firstly to educate the farmer along the right lines for working, and secondly, to provide transport facilities for conveying the lambs from the farm to the works. He felt confident that now that the Peninsula had an adequate water supply, there was nothing to hinder the development of this most important industry. In the past, when wheat and wool prices were at a high level, it was impossible to interest the farmer, but now that the position had changed, farmers and pastoralists should not hesitate to give the business a trial. He suggested that the Agricultural Bureau should take the matter up and that each Branch should do all in its power—with the aid of the departmental officers—to ascertain what each district could do in the matter. The departmental officers who toured the country could do all that was necessary in the way of educational work without incurring any additional expense. (Secretary, Mr. J. Vigar.)

#### MUDAMUCKLA.

Meeting held September 11th. Present: 12 members. The agenda for the 1930 Annual Congress was discussed. (Secretary, Mr. T. Zippel.)

#### PINBONG.

The meeting of September 6th was held at the residence of Mr. H. Scholz. An address, "Fallow and its Working," was delivered by Mr. W. H. Brownrigg (District Agricultural Instructor). (Secretary, Mr. C. Scholz, Yaninee.)

#### PINKAWILLINIE.

The meeting of September 6th was presided over by Mr. F. Freeth. Matters relating to crop competitions, Kimba Conference, and the Annual Congress were discussed. Eleven members and several visitors attended. (Secretary, Mr. S. Johnson.)

#### ROBERTS AND VERRAN.

September 3rd, 1930.—Present: Eight members.

**MOTOR TRUCK v. WAGON FOR FARM HAULAGE.**—Mr. K. Pahl read the following paper:—"Horses are essential for effectively working the farm, but as means of transport they are too slow if a farmer has to cart any great distance. I recommend the 1-ton truck for the average farmer. In harvest time wheat can be carted straight from the harvester; there is no loss of wheat from wet weather, and reaping will be done more quickly because the team can work without interruption. During seeding, super, &c., can be carted while the team works the fallow, thus increasing production. Where haulage has to be done off the farm, it pays to use the truck; it is cheaper and takes less time." Mr. A. Ramsey said in busy seasons and when wheat was plentiful each man had to wait his turn to get his wheat unloaded, and that would prevent the man



with the truck from carting many more loads that day. With a truck one had to work faster to cart the same amount as the man with the team. The teamster took his time, delivered his load without any worry of blowouts, engine trouble, &c. He considered the wagon better and less expensive for general haulage. Mr. J. Pahl said in a new hundred, where water and other commodities had to be carted long distances, the truck was essential so that the team could do the work on the farm while the truck did the hauling. It could also take the place of a car for a conveyance. On more established farms he favored the wagon. Mr. V. Jonas favored the wagon. He considered the life of a truck too short to be an economical investment, and the upkeep was too great for the average farmer. In new hundreds a truck would be essential to effectively work the farm. Mr. R. Paxton considered the use of either truck or wagon was governed by conditions. His experience with a truck was that he could cart quicker and cheaper than with horses. Work could be proceeded with on the farm while carting was being done with the truck, thus keeping up with operations. The truck would cost more when repairs were needed and so become more expensive, but, at the same time, a horse might die, which would probably be as expensive as repairs to a motor. Mr. S. Barber had had considerable experience with both methods of transport, but favored the wagon. One load a day would be equal to four truck loads with less wear and tear. Blowouts in the hot weather had to be reckoned with, which in itself, apart from the time wasted, was expensive. General repairs soon mounted up and made a truck very expensive. Mr. C. Masters thought a truck too expensive for general farm work. Wear and tear and upkeep was much more than for the wagon. Horses might die, but young horses could be reared cheaper than trucks could be repaired, thus the wagon would be cheaper on established farms. In new districts probably a truck could be used with advantage. (Secretary, Mr. C. Masters, Verran.)

RUDALL (Average annual rainfall, 12.07in.).

September 9th.—Present: 13 members and two visitors.

**MAKING A HOME IN THE MALLEE.**—Mr. A. Jericho read the following paper:—“Seldom does a farmer pay enough attention to the geographical position of the land he intends to occupy, as well as the class of land, water supply, and other items which may bring success or failure to the venture. Any section after being allotted must be worked according to conditions typical to that class of land. *Light Soils.*—Under this heading most of the land of Eyre Peninsula in the lower rainfall areas can be dealt with. Fortunately, of late years this land has proved that it is a profitable venture to deal with. Labor and capital are two important factors in the mallee. A farmer should not expect more than a fair rate of interest on his outlay the first three years. The first expense in clearing the lighter soils is negligible; but before it is brought up to a standard that will give profitable returns it will be found that it has cost more than the heavy soils. This is an important factor often overlooked by inexperienced settlers. In opening up a new section either a log or a roller is effective, but after the first year usually the disc plough plays an important part in dealing with black sticks. Usually farmers wait for that day to come, thinking only a hot gale from the north will give them a good burn; but the risk of the fire getting out of control is too great, and very good burns can be obtained with steady winds from other quarters. A commendable practice, worthy of serious consideration, is the fallowing of new ground. The drift problem

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should receive more consideration while the original scrub is on the land. Any land likely to drift should not be cleared in too large areas. Experience has taught that it is less costly to clear land at a later date than to clear too much in the beginning and start the land drifting. Last, but by no means least, good wind breaks should be left around the proposed homestead site. A farmer neglecting this item may be successful on his selection for 20 years and then find his home and sheds in line with the drift, which is not only uncomfortable but expensive." (Secretary, Mr. J. McKinnon.)

#### SMOKY BAY (Average annual rainfall, 10.44in.).

Meeting held August 23rd. Present: Mr. G. Lovelock (chair) and 14 members. Matters of local interest were brought forward for discussion. (Secretary, Mr. K. Harrison.)

#### TARAGORO.

October 2nd.—Present: 14 members.

**CARE OF MACHINERY.**—Mr. E. James read the following paper:—"One of the biggest problems of the farmer to-day is the cost of production, and the high prices we have to pay for machinery makes a big inroad on the returns from the farm, therefore every farmer should give his machines proper care and treatment, which lowers the cost of their upkeep and lengthens their life of service. There are three important points: housing, keeping all nuts tight, and proper lubrication. All woodwork should receive a coat of boiled oil each year and paint every three years. For lubrication of all implements I recommend a light-bodied motor oil, because in the summer it will resist the heat and during seeding, generally cold, it will run freely to the bearings. When putting away harvest machinery clean all congealed oil and dust from around bearings. Fill the bearings with oil, as rust will attack a worn surface if not covered with a film of oil. Place a block under the off-side of the comb of the stripper or harvester to prevent sagging. When a binder is put away on the transport, lower the big wheel on a block to take the weight off the frame, and put a coating of thick oil or grease on the knoter. With the drill or combine, thoroughly clean out the super and seed boxes before putting them away, and treat the bearings the same as stated before. The most abused implements are the plough and cultivator. Sometimes when a part has to be taken off to be mended or replaced nuts cannot be unscrewed owing to rust, and they have to be cut off, which means the loss of a bolt, a coating of paint every few years would prevent that. Another asset is a blacksmith's shop on the farm. A handy man can do minor repairs and save expense, but it is essential that all the machinery should have systematic oiling and careful driving to prevent deterioration."

On October 15th Mr. W. J. Spafford addressed the Branch on the subject "Agricultural Practices." There were present 12 members and 24 visitors.

**PREPARING FOR HARVEST.**—At the meeting held on November 6th, and attended by 18 members, the following paper was read by Mr. W. Whittaker:—"In preparation for harvest, there should be careful consideration as to machinery, horses, and tractor. Horses should be given at least a fortnight's spell from work and their harness, chains, &c., put in perfect condition. The head should be taken off the tractor and cleaned, valves seen to, big ends tightened up, and all grease, oils, and worn parts replaced with new. The first machinery generally used for harvest is the binder, which should be in good condition so as to get the hay cut, stooked, and stacked before reaping. The knife should be sharpened, knoter re-oiled, big wheel, fans, canvasses, pole, swings, chains, &c., replaced, and transport wheels removed. The second machine used is either the stripper, header, or harvester. Out of these I prefer the stripper, because it is the only machine that will stand up to rough conditions. The harvester or header are satisfactory in a good year, but when we have to go over much ground for a small amount of wheat the stripper is the most payable. In preparing the stripper, the belt should be well oiled with used tractor oil. If this is done no resin will have to be applied. The set screws in the beaters should be tightened, forks placed in good order, and chains, swings, and belt replaced. If the reaper is used, a winnower must also be used. I prefer a power winnower because all heads are thrashed, reaping can be done in cold weather, and a much better sample is obtained. Belts should also be oiled, elevators tightened, sieves replaced, thrasher in good condition, and forks oiled. To have a successful harvest, so far as the machinery is concerned, all parts should be kept well oiled, a good standard harvesting oil should be used, and all nuts and bolts should be tightened or replaced as soon as they are broken or become loose."

**GARDENING.**—Mr. E. Rudland read the following paper:—"I propose to outline a few points of interest of the most popular form of gardening as generally practised on farms, in a comparatively light rainfall area. First and foremost is the selection of plot for the proposed garden. I favor a slight depression in the soil, because the ground in these parts is usually more fertile and has a tendency to retain moisture longer than that situated on a rise or slope. Remove all stumps. Cultivate the plot with a single-furrow plough and root the soil to a good depth. This will save many disappointments.



A garden that has been poorly cultivated will never return the yields that one will receive from deeply ploughed land. As the natural soil is rarely fertile enough to produce heavy yields, it is advisable to apply and work in a heavy dressing of cow manure. In order that the plants will be well protected from live stock, a good fence should be erected, and if in an exposed place, reinforce with a breakwind. Paths should be built at least 6 in. above the level of the beds and graded to drain water off. When the garden has been marked out in sections scatter about 2 in. of fresh horse manure to provide warmth, then dig in lightly. As regards the growing of vegetables, full details of seasonal crops can be found in the weekly papers. Nearly all root vegetables require a deep rich soil, and they respond readily with the slightest attention. For cabbages and cauliflowers, plenty of room must be allowed—at least 2 ft. each way. For early results plant seeds at the end of February. This will give strong plants a chance with the first rains. Do not plant all seeds at the same time, but endeavor to secure a steady flow of vegetables for the house. Cauliflowers need a little assistance to produce good heads; the general practice of experienced gardeners is to gather the outside leaves and lightly tie them; this protects the heads from the sun and dust. Peas are easily grown, and respond well without much attention. The summer garden needs more care, and plants grown as early as possible will produce fruit when it is needed. Cucumbers, pumpkins, and all marrows need abundance of water. With tomatoes more care is needed, both in growing and watering. They should be given plenty of water to keep them growing healthily. If the plants are pruned and trained they will produce a splendid amount of fruit. The ground should be kept loose, and if kept moist black spot will not develop. Flowers do not appear to be popular here, but nothing is more pleasing than a well-grouped display. Even a few blooms brighten the homestead; it does not matter a great deal about the varieties, as each has his own taste, but a little energy in this direction will be amply repaid, both to the owner and the visitor." (Secretary, Mr. T. Winters, Cleve.)

#### WALLALA.

September 10th.—Present: 13 members and three visitors.

Mr. K. W. Neild read a paper, "Harvesting Machinery." He said harvesting machinery could be divided into two classes, the harvester and header and the stripper and winnower, each of which had its own particular advantages. The header and harvester had been brought almost to perfection during the last few years and were now extensively used owing to the speed and economy with which they could handle the crops. Their disadvantage was that they deteriorated quickly and were not so successful when used on the rough stump land, which constituted a large area of the farming lands of their district. That fact, together with the adverse seasons experienced of late, had influenced many farmers in favor of the stripper. The main advantages of that machine were that it was easier to operate, had less wear and tear, and efficiently handled very light crops. In normal years, where there was a very large area to be reaped, it must be done in the cheapest possible manner, and for this reason the header or harvester should be given serious consideration. It eliminated the risk of large losses due to rain during the harvesting period and considerably reduced the labor required to harvest the crop. On the other hand, although the use of the stripper entailed much more work, it was very useful on stump land and for reaping the poorer crops in very dry years. Assuming that the average farmer of their district cropped 700 acres annually, he would require two implements to harvest the crop, and he considered that a stripper used in conjunction with a harvester or header would form the most economical harvesting plant for their conditions. The header or harvester could be used wherever possible, and either implement driven by a small engine would make a very efficient winnower. Two men would thus be able to complete the whole of the harvesting operations in a minimum of time. On a one-man farm the harvester fitted with a chaff-saving attachment would enable the farmer to do his own harvesting, and at the same time to save a considerable quantity of feed for the stock. The writer stated in conclusion that the Australian-made machine, being made specially for local conditions, compared very favorably with any other implement. (Secretary, Mr. C. F. Zippel.)

#### WARRAMBOO.

September 9th.—Present: Eight members.

STARTING ON A NEW SCRUB BLOCK.—Mr. F. Chilman read the following paper:—"One of the first essentials in starting on a new block is to find the best site to erect the homestead; preferably the best position is in the centre of the block, not too far off the main road. The reason to get near a main road is you always have the chance of having a fair road to travel on, and then pipetracks and telephones generally follow a main road. Try and choose a sloping piece of ground for the homestead, so that water can drain away from the house; also pick a good patch of soil for a garden



later on. Clear the scrub so that the convenient paddocks can be worked from the stable with the minimum amount of travelling. In clearing light whipstick scrub, I prefer a fairly heavy log. The heavier class of scrub needs a roller to get it down, and there are some blocks where the axe is needed. After the scrub is down, if it is possible, cut all springbacks that are left standing to ensure a clean burn. Clear a fire break around the scrub. That is fairly easily done by burning a break on calm nights, when the fire can be kept under control. After the burning season opens, get the scrub burnt as early in the summer as possible, see that sticks are picked, and cultivate it as soon as possible after burning. Then drill in with a disc drill, preferably after a rain. As soon as possible get the homestead in comfortable order. This again lies with the amount of capital available. But always aim at putting permanent improvements, and in such a way that it is easy to add to them. All fences should be permanent and as many paddocks as possible opening into the stable yard. Sometimes it is necessary to erect a race to lead into a paddock, but always aim at a minimum amount of fencing with handy sized paddocks. It is a good plan to have a couple of 20 or 30 acre paddocks joining the house for the milking. Always aim at making the stables on the south or east side of the house, and there will not be very much trouble with dust and rubbish from the stable blowing around the house. The next essential is to provide a water supply handy to the house and stables. In this district it is difficult to get clay for sinking dams, but there are many places where underground tanks could be put down. Fortunately the Tod main has saved this district from a water shortage. A person need never be idle on a farm, as there is always some improvements to do, such as fencing, making the home more comfortable with outbuildings, gardens, &c. Much can be done to make things comfortable without any great expense if we make the best use of the material we have, such as petrol tins and drums, and there is plenty of stone if anyone is handy with the trowel." Discussing the paper, Mr. W. Morris thought the better method to adopt to provide fire breaks would be to throw the timber back into the rolling for 15ft. or 20ft. all around and thus form a bank of timber on the edge of the rolling which would provide a good bank of scrub to light up on when the burning season opened. If this was done on the day the settler decided what wind was most suitable for him to burn, he could proceed with his assistants to light up the bank opposite to the way he intended the fire to run. It would then gradually burn back into the rolling and make a wider break for the main body of the fire to burn on to. By this method he would not be compelled to go around early in the morning and put out the ends of burning sticks and stumps which so often proved a danger and were the cause of many fires starting in standing scrub. Mr. O. Murphy agreed with the writer in respect to the leaving a small belt of scrub where it was intended to erect the homestead to serve as a breakwind. He was inclined to support the Yadnarie Branch of the Bureau in their resolution asking that the settler be compelled to leave three chains of standing scrub around the holding. This would not only act as a breakwind, but would help to keep drift in check. With regard to a young man starting off "scratch" on a new farm. This he considered was a big handicap and thought that it would be a better proposition if the young man engaged in share farming for a year or two as he would not only gain experience, but would possibly provide a few pounds in cash as a standby when he needed it to start with. Mr. A. Turner considered it was always better to build a heap of timber around the rolling in preparing the breaks. This could be done immediately the scrub was rolled or logged and gave the settler the chance to burn off the rubbish during the cool evenings. Mr. E. Oswald indorsed the remarks of previous speakers in regard to throwing in of breaks around the rolling preparatory to burning. Mr. N. Crawford always made a practice of making a good break on three sides of the clearing and heaped up a break on the northern side to provide a good bulk of stuff for the fire to start from.

On Wednesday, September 10th, Mr. W. H. Brownrigg (District Agricultural Instructor) gave a demonstration of classing the farmer's flock. An address was given by Mr. Brownrigg in the evening on the "Building of the Farm Flock." (Secretary, Mr. E. Adams.)

#### WIRRULLA.

August 28th.—Present: Seven members and one visitor.

The meeting took the form of a "Question Box." The following queries were dealt with:—"What is the best variety to grow in place of Late Gluyas?" Members considered that although the variety did not seem to be giving such good results as in the past, they would not advise using another variety as the main crop, because it had proved itself in the past. Federation, Nahawa, and Gallipoli were mentioned as giving good results. "What is the best breed of cow for this district?" Members



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favorable a dual purpose cow, which would be suitable for beef purposes, since there was not much demand for milk and butter. "Do members think super injurious to the soil?" Most members considered that super was very beneficial, but did not advocate heavy dressings in light rainfall districts. "What is the best depth to fallow in this district?" About 3in. was the general opinion, with the frequent use of the mould-board plough. "What is the best type of horse for farm work in these parts?" The light, clean-legged horse with plenty of bone and good body was most favored; all were against the heavy, hair-legged type. "Is there any period of the season for cutting mallee posts to render them less susceptible to the ravages of white ants?" One member had heard that if fresh cut posts were put in the hole with the smaller end in the ground, the sap would drain out and the posts would last longer. The soft, sappy posts generally appeared to be attacked most by the white ants. One suggestion was that if trees suitable for posts were ring-barked, by removing a strip of bark around the trunk, the trees would not die quickly, thereby seasoning the timber and making it very hard, which might check the ants. (Secretary, Mr. H. Doley.)

## EASTERN DISTRICT.

### (EAST OF MOUNT LOFTY RANGES.)

#### BOOLGUN.

October 2nd.—Present: 16 members.

Sixteen members attended the October meeting, when a paper, "Breeding Horses on the Farm," was read by Mr. T. Stoeckel.

**PIGS ON THE FARM.**—The following paper was read at the November 2nd meeting by Mr. Pfitzner, 13 members being present:—"Many farmers do not pay any attention to pig keeping, but the too-often despised pig is probably, if given proper care and attention, one of the most profitable kinds of live stock on the farm. Farmers should try and breed their own pigs, and in doing so select sows that show length and depth. If possible, try and get sows from large litters, as they are more likely to propagate large litters than those bred from a small litter. It is obvious that the more pigs a sow can produce during her life the smaller per head is the cost of producing them. The sow being the most prolific of all farm animals, is a point strongly in favor of pig keeping. As a sire, it is desirable to use a pedigreed boar. He should be selected from a uniform litter, be of good quality, and should have length and depth, good hams, and strong legs and joints. It is most essential that both sow and boar should not be too fat when mated to get best results. All pigs, other than those fattening for the market, should get plenty of green feed and should be allowed to run out so that they can then forage for mineral foods. It is through pigs that skim milk and swill can be turned to profit. Feeding is quite as important as breed; the best pigs can be spoilt by improper feeding. During winter and cold weather the pigs should have a dry and warm place in which to sleep."

**GROWING LUCERNE WITH BORE WATER.**—A paper on this subject was read by Mr. Woolard at the meeting held on January 29th, which was attended by 11 members. "It is safe to say that on nearly every farm in this district there is a claypan close to the bore. These claypans are suitable places on which to grow lucerne. In the first place, try to get the plot in a position so that it can be irrigated from the bore. Trench the plot 1ft. deep, mixing in at the same time good stable manure. When the trenching is done, remove all hard lumps and stones and leave the plot as near level as possible and with a fine surface tilth. Take a small hoe or stick, make shallow furrows, and run in the seed at the rate of about 10lbs. to the acre. Wait for a favorable rain to start it, and when about 1ft., make the first cut. After cutting, run the water on so that it gets a good flooding. Do not water again until it wants cutting. Always water after cutting, so that you keep the water clear of the leaves." (Secretary, Mr. J. Palm.)

#### BOWHILL (Average annual rainfall, 12in.).

There was an attendance of 21 members and 14 visitors at a meeting held on September 8th. Mr. S. Taylor delivered an address, "Voluntary Pooling." (Secretary, Mr. M. Banks.)

The meeting of October 20th was held at the residence of Mr. H. Just, there being present 28 members and 10 visitors, including the District Agricultural Instructor, Mr. R. L. Griffiths

#### COOMANDOOK (Average annual rainfall, 17.47in.).

Sixteen members and 10 visitors attended the afternoon meeting, which was held at the farm of Messrs. Upton Brothers, when Mr. O. Goddard, of the School of Mines, gave a woolclassing demonstration. In the evening he delivered an address "The Sheep and Wool Industry and Farm Management of Sheep." (Secretary, Mr. W. Trestrail.)



**CLANFIELD** (Average annual rainfall, 16in. to 17in.).

Meeting held September 18. Present: Five members. The report of the delegates who attended the Pinnaroo Line Conference was received and discussed. (Secretary, Mr. W. Pearce.)

**KULKIWIRRA.**

September 9th.—Present: 17 members and three visitors.

**SIDELINES ON THE FARM.**—Mr. Coombs contributed the following paper:—"Sidelines are as necessary as crop growing. I place sheep first because they are useful in so many ways. They provide a considerable amount of revenue, help to keep weeds of many descriptions in check, provide the house with meat, and assist considerably with the fallows in regard to packing. I recommend keeping ewes. There is less risk with them than with dry sheep. I favor the Corriedale breed for this country, and would suggest crossing with either Dorset Horn or Shropshire. Both these breeds give a good lamb that will grow fast and is well liked by butchers. Endeavor to have sheep-proof fences before going in for sheep. Cows are essential for convenience and comfort for the house and the ladies therein. Jerseys are favored because they keep the supply of butter going for a much longer period than the larger breeds. The latter have many admirers and supporters. For these breeds most farmers emphasise the value of the calves for butchering and the amount of butter they will make in the flush period of the year. I am not in favor of keeping a lot of cows unless the farmer has a large family of girls to attend to them. Another point in favor of larger breeds over the Jersey is that when a cow has got to the stage when it is not profitable for milking they have a higher monetary value. This, however, is not so high as it would at first appear. If the amount of food consumed during the life of both breeds over a period of, say, 10 years, is taken into consideration, I think that the Jersey will show to have been more profitable. The Jersey is not a delicate breed and will hold its own with most of the other breeds. If cows are kept, pigs will be found necessary. I have been keeping a Duroc boar for two years now and find them very satisfactory. They keep in better condition during the growing period, are more contented, and easily kept in the sty. I feed barley as the main food, and they are always supplied with whole corn. I use a petrol drum split in halves lengthways and let it in the ground a little way to stop it from rolling over. The best method is to crush the barley and keep it in a self-feeder so that the pigs can help themselves. I keep most of the pigs until they are about 160lbs. to 180lbs. live weight. Fowls are another of the sidelines managed by the ladies. They are easier handled and more profitable than cows. I favor one of the larger breeds of fowls, but if eggs are the main object, then the White Leghorn is not excelled. The larger breeds are more saleable when they have served their term of laying. They can be kept out of the garden, haystack, and farm machinery, and generally lay better during the winter months. The above remarks apply chiefly to an egg-laying strain. I strongly advise every farm homestead to have a kitchen garden. If a record is kept it will prove itself profitable, and vegetables grown on the property are much better than those that are purchased." (Secretary, Mr. H. J. Elliot.)

**LAMEROO** (Average annual rainfall, 16.95in.).

Meeting held September 27th. Present: 12 members. A report of the proceedings of the Annual Congress was given by Mr. C. Wendt and the Secretary (Mr. E. Koch.)

**MERIBAH** (Average annual rainfall, 11.70in.).

At the meeting held on September 8th, Mr. W. Mason presided over an attendance of 17 members. The report of the delegates to the country crop competition was received and discussed. It was decided to hold a local crop competition, for which two trophies valued at five guineas and two guineas have been offered. (Secretary, Mr. E. Carr.)

**MILLENDILLA** (Average annual rainfall, 13in.).

The Secretary, Mr. V. Wegener, gave an interesting account of a trip he had made to New South Wales. There were present 10 members and several visitors.

**MONARTO SOUTH** (Average annual rainfall, 14in. to 15in.).

Meeting held September 20th. Present: Mr. A. Braendler (Chair) and 29 members. Messrs. Hein and Kuchel reported on the Annual Congress. (Secretary, Mr. C. Altmann.)



## NETHERTON.

September 3rd, 1930.—Present: 21 members and visitors.

**SIDE LINES ON THE FARM.**—Mr. Johncock, in the course of a paper on this subject, said side lines such as cows, fowls, kitchen garden, and pigs should prove of very valuable assistance to the household expenses to the man who was just starting on a new block. Cows were essential on every farm, especially where there was a family. Six good cows would produce on an average £90 worth of produce. In the Netherton district it would be necessary to hand feed for six or seven months of the year. Each cow would require 20lbs. of chaff per day, and for the remainder of her fodder should be able to obtain sufficient roughage in the paddock. A paddock of about 24 acres sown with 20lbs. of wheat, 30lbs. of oats, and 90lbs. of super should provide feed for six cows from early June until the end of the year. A cow eating 20lbs. of chaff per day would consume 1½ tons of chaff, at £3 per ton, £5 5s. per cow—for six cows equals £31 10s.; 8bush. wheat at 4s. equals 32s.; 15bush. oats at 2s. 6d. equals 37s. 6d.; 1 ton farm feed £3; 1 ton super £5—£36 19s. 6d. Produce from cows £90; balance £50 0s. 6d. Sale of five calves at £3 each, £15—total £65 0s. 6d. Fowls.—He recommended the White Leghorn. Twenty-five bags of wheat would feed 100 laying hens during the year if birds were allowed free range on the farm; 100 hens should produce £40 worth of eggs each year, less 25 bags of wheat at 12s. per bag equals £15, leaving a profit of £25. It was difficult to give an estimate of the value of the kitchen garden. Where sufficient water was available practically all kinds of vegetables could be grown. Pigs.—Three pigs could be fed on the waste milk from six cows, and with 6bush. of pollard to top off each pig the animals could be used as fresh pork, cured for bacon, or marketed. A pig at five to six months of age should weigh 130lbs.; market value about £4 each pig equals £12. Cost of feeding, 18bush. pollard at 1s. 9d. equals 31s. 6d., profit £10 8s. 6d. Replying to questions, Mr. Johncock said the hens would lay better without running with the roosters if they were locked up. Mr. Wilkin said that sheep kept for rations could be classed as a profitable side line. (Secretary, Mr. C. Wilkin, Yumali.)

## NUNKERI.

September 10th.—Present: 11 members.

**SHEEP DIPPING.**—Mr. C. Grill read the following paper:—"All sheep should be dipped for the destruction of parasites. Merinos about five weeks after shearing and crossbreds about two months. Sheep should not be dipped straight off shears, there is not sufficient wool to hold the ingredients of the dip. A dip 40ft. long, 22in. wide, and 5ft. deep will save a lot of trouble and insure thorough saturation of the fleece, which is absolutely essential if dipping is to be effective. The drainage area for small flocks should be about 16ft. by 18ft., divided into two pens, so that when one pen is full it can be shut off and allowed to drain while the other is being filled. In this district limestone, mortar, and cement, reinforced with wire-netting, is a very suitable building material. There are many ways of getting the sheep into the dip. One way is by having a race lengthways across the edge of the dip and slanting boards at the dip, which should be kept very slippery, so that when sheep pass along the race and step on to the boards they slip into the dip. Another method is by using the same kind of race and a trap door, which has the same effect, but old sheep that have been through a few times are hard to get through the race. The best method is a small pen at the mouth of the dip that will hold about 20 sheep, with other yards made handy for filling up; if one man gets in the pen and catches the sheep by the hind leg and one arm around the neck it is easily pushed into the dip without being knocked about and gets properly treated while in the swim. With the race style of dipping lambs often go too fast and fall in, one on top of the other, or on their backs or sides, or head first, in which case they are liable to take a mouthful of the dip, and it also makes it difficult for the man with the prod to handle them properly. The heads of sheep should be pushed under twice during the swim, care being taken to allow breathing space between each plunge. For the strength of the dip one should be guided by the directions on the packets. Any recognised dip, preferably an arsenical, which is most effective. Keep the bath stirred up from the bottom and see that the scum that accumulates on top is skimmed off. Sheep should be yarded over night and dipping begun early in the morning, and continued only so long that the sheep can dry before night. If this is carried out much fouling of the bath will be avoided, but care must be taken that the sheep are not thirsty, because they are apt to drink the wash or lick up the floor of the draining pen. Dipping should not be carried out in wet, cold weather, as the sheep may suffer from the effects and contract pneumonia, and rain falling on newly dipped sheep may result in scalding and mortality. The rain falling on sheep wet with dip carries particles which should adhere to the wool right down to the skin, resulting in an overdose. When the sheep are quite dry there is no risk. Shade drying, or a cool day makes the dip more lasting in the wool, and prevents scalding which may result if the sheep are turned



out under a very hot sun. To avoid dip-stained wool, the bath should be emptied and thoroughly cleaned out at regular intervals, or when it is noticeable that the dip is heavily laden with dirt which has been washed out of the wool. Rams should be dipped first, then adults, and lambs last. Do not hurry the dipping, but allow sufficient time in the bath for the dip to reach the parasites right down on the skin. If the dipping of sheep is properly carried out there should be no loss or trouble from year to year. Any sheepowner who has had experience with ticks or lice well knows the value of dipping. Lice are the worst offenders, the sheep rub against the fences and logs, or any obstruction that may be in the paddock, until the wool becomes tangled and matted, and in some cases rub themselves bare to the skin, which destroys the whole fleece. With the constant irritation the sheep become very poor, which is detrimental to the rearing of fat lambs. The Compulsory Dipping Act is very essential, for careless sheepowners with lousy sheep are of great annoyance to their neighbors." (Secretary, Mr. F. Ling.)

#### OVERLAND CORNER (Average annual rainfall, 10.58in.).

The meeting of September 1st was held at the residence of Mr. J. Loffler, there being present Mr. T. Atkinson (Chair), 14 members, and two visitors. An address, "Diseases of Wheat," was delivered by Mr. R. L. Griffiths (District Agricultural Instructor). (Secretary, Mr. H. Loffler, Wirrelyerna, via Morgan.)

#### PARILLA (Average annual rainfall, 13.70in.).

Mr. C. Neindorf presided over an attendance of 12 members at the annual meeting which was held on July 8th. Officers were elected and a programme arranged for the ensuing 12 months.

A further meeting held on September 2nd took the form of a "Question Box." Fourteen members were present.

A previous meeting held on August 5th was attended by 20 members. Members discussed the subject, "Clipping Horses." (Secretary, Mr. C. Foale.)

#### PARUNA.

The monthly meeting was held on September 5th; twenty-six members were present. A debate was held on the subject, "Harvesters v. Strippers," and resulted in favor of the stripper. (Secretary, Mr. F. Sumner.)

#### PATA.

Meeting held September 25th. Present: 10 members and two visitors. Mr. R. L. Griffiths (District Agricultural Instructor) delivered an address, "Wheat Yields in the Murray Mallee Lands." (Secretary, Mr. A. May.)

#### RAMCO.

Meeting held September 8th. Present: Mr. J. Boehm (Chair) and eight members. Mr. Boehm informed Mr. Burroughs that the best time to apply manure to orchards was just before the first irrigation. Other subjects of interest to river settlers were also discussed. (Secretary, Mr. J. Odgers.)

#### WAIKERIE (Average annual rainfall, 9.61in.).

Meeting held September 25th. Present: Mr. E. Rowe (Chair), 11 members, and six visitors. Mr. G. Quinn (Chief Horticultural Instructor) delivered an address "The Codlin Moth," and presented the prizes won at the Waikerie and Ramco Pruning Competitions." Secretary, Mr. E. Rowe.)

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## YURGO.

September 9th.—Present: Eight members.

ODDS AND ENDS ON THE FARM.—The Secretary (Mr. M. Walker) read the following paper:—"The old adage, 'Take care of the pence and the pounds will take care of themselves,' is one that can be applied in many ways on the farm, one of them being the profitable realisation of material which is usually considered to be waste and scrap. The packing around cornsacks—there are many uses to which the hoop-iron may be put, such as spreaders for swingletrees, taking the place of a chain for pulling up the bag lifter, staying swing gates, frames into which can be fitted a kerosene tin bucket, a dozen 18in. lengths fitted into a wooden frame on edge makes a splendid boot scraper. The square fasteners and pins also come in very handy, and one can always find a use for them. The former make good washers for taking up the slack bolts on a scrub roller frame, whilst the mild steel pins are first class for use as rivets, being of various sizes there are often jobs in which they can be used. The sacking covering the bags makes a good cloth for use under the winnower and grader, especially that from off the ends, which frequently is of a much stouter texture than the remainder. Good packing cases should be carefully knocked to pieces, the nails put into a tin, and the boards packed away out of the weather. They will do as well for the job as other timber which would have to be purchased. All scraps of wire should be carefully picked up and put into a heap, or hung up and used to tie on the barb or spring coil when fencing. Shorter pieces come in handy for fastening netting. The waste oil from motor vehicles can be sprinkled on the smithy floor (if on earth). This helps to keep down the dust. It may also be used to advantage if poured around fence posts, gate posts, shed posts, &c., to arrest and prevent decay and check ravages of white ants. Super bags, if cared for and put away, can be used for storing oats and fowls' feed. Never use oil from motor vehicles on any machinery, because it cuts the bearings badly."

Eleven members and 16 visitors attended a meeting on September 29th. Messrs H. B. Barlow (Chief Dairy Instructor) and P. H. Suter (Senior Dairy Instructor) delivered addresses on the subject, "Care of the Cow on the Farm."

At a meeting held on October 27th, with an attendance of 19 members and visitors, Mr. C. F. Anderson (Poultry Expert) delivered an address. An interesting discussion followed.

On November 5th 11 members and visitors toured the district and made an inspection of the crops. An average of six bags per acre was expected for the district. (Secretary, Mr. M. Walker.)

## SOUTH AND HILLS DISTRICT.

CLARENDON (Average annual rainfall, 33.91in.).

Meeting held September 8th. Present: 20 members and visitors. Mr. J. Spencer addressed the meeting on "Planting Potatoes," and replied to numerous questions. A competition was held, each member cutting three potatoes for seed. The winner was Mr. Rex Potter.

A meeting held on October 5th was attended by 11 members and visitors. Messrs. T. B. Brooks and J. Potter gave reports of the Annual Congress.

A further meeting was held on October 22nd at Mr. D. R. Spencer's homestead. After an inspection of Mr. Spencer's field peas the properties of Messrs. H. C. Harper, L. C. Spencer, and E. A. Harper were visited. (Secretary, Mr. T. B. Brooks.)

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

Sixteen members and visitors, including a member from the Kimba Branch, attended the meeting held on September 25th, when Mr. R. Hill (District Agricultural Instructor) delivered an address, "Relative Value of Foodstuffs." (Secretary, Mr. H. Lewis.)

LANGHORNE'S CREEK (Average annual rainfall, 14.80in.).

Meeting held September 3rd. Present: 18 members, seven visitors. Mr. B. Caseley gave an address on dairying. Mr. W. Yelland also spoke on the subject, "The Farm Garden."

A further meeting on October 1st was attended by 18 members and four visitors. The delegates submitted reports of the Annual Congress.

Meeting held November 5th.—Present: 20 members and three visitors. Mr. E. W. Pritchard (Botanical Assistant, Department of Agriculture), delivered an address, "Weeds and Grasses of the District."

At the monthly meeting on December 3rd, Mr. A. R. Hilton, B.Sc., of the Murray Bridge High School, gave an address dealing with agricultural education in the United States of America. His address was illustrated with lantern slides. (Secretary, Mr. H. Pollett.)



LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 36in.).

Meeting held September 29th. Present: 13 members. The Hon. Secretary read a paper, "Plant Requirements and Soil Conditions."

Meeting held January 27th. Present: 11 members. A representative of the Producers Distributing Society addressed the meeting on the subject, "Better Marketing Facilities." (Secretary, Mr. B. Lawrence, Lenswood.)

PORT ELLIOT (Average annual rainfall, 20.33in.).

September 24th.—Present: 13 members and three visitors.

PASTURE DEVELOPMENT.—Mr. R. Hill (District Agricultural Instructor) delivered an address on this subject. A keen discussion followed. Mr. Hill said that the best type of pasture consisted of about 25 per cent. clovers and 75 per cent. mixed grasses. He did not advocate ploughing our scrub after clearing before planting clover, because it turned over the sour soil, and also left no covering for the growing clover. Mr. Hay asked what kind of clay subsoil was the better—the light-colored or the darker. Mr. Keen said that he had seen a better stand of Perennial Rye on the lighter. Mr. Hill stressed the value of meadow hay, and said that the time to cut same was just when the growth started to drop. Discussing peas, Mr. Smith said that he had noticed an improvement in growth where he had put pig manure. Again touching on the ploughing of scrub, Mr. Hill said that if this was done, a cover crop of oats should be put in. (Secretary, Mr. H. Lowe.)

Ten members attended a meeting held on November 8th at Mr. H. J. Jagger's homestead, at Inman Valley. Members inspected the sheep and pastures on the property.

A meeting on October 25th was attended by 21 members and visitors, and took the form of an inspection of Mr. Geo. Deplidge's farm, at Waitpinga (Secretary, Mr. A. Lowe.)

#### SCOTT'S BOTTOM.

The meeting on September 6th was attended by eight members. The agenda of the Annual Congress was discussed and delegates appointed. (Secretary, Mr. E. Atkinson, Cherry Gardens.)

October 4th.—Present: Nine members.

FARM MANAGEMENT.—Under the title "Things that should be Cared for on a Farm," the following paper was presented by Mr. A. Martin:—Attend to fences and gates, so that the livestock on the property are kept within bounds. If there are good fences and gates, you will not be troubled with other people's stock if they are allowed on the roads. It is a good plan to clear away 2ft. each side of a fence, so that it will be possible to save the posts from getting burnt in case of fire. Machinery and tools should be kept in the places set apart for them and maintained in good working order. Oiling and greasing of any machine should always be looked to at least once a day to save the wearing of parts. Oil and grease are far cheaper than new parts. Creeks and small gutters should be cleaned out periodically so that if at any time there comes a heavy rain the water can get away and not remain on land that may be required for cultivation or under crop. This paper was discussed, and with "Economy on the Farm" proved very helpful. The following suggestions were made:—Growing own meat; growing fodder for stock; making an early start in the morning; having work planned out; using sharp tools; not overstocking the paddocks; and seeing that all bags, &c., are not left out in the open.

The annual meeting was held at Mr. B. Thorpe's residence on November 1st, there being present eight members. The annual report was read and officers elected.

Items of local interest were discussed at the meeting held at the residence of Mr. Blakeley on December 6th, which was attended by eight members. (Secretary, Mr. E. Atkinson, Cherry Gardens.)

#### SPRINGTON.

A "Question Box" evening was held on September 3rd, 13 members were present.

The meeting on October 1st was attended by 18 members and numerous visitors. Mr. C. A. Goddard (Assistant Wool Instructor, School of Mines) gave a demonstration of wool classing at Mr. B. Forrest's shearing shed. In the evening Mr. Goddard delivered an address on sheep and wool.

Twelve members and visitors attended the annual meeting on November 12th. The Hon. Secretary (Mr. E. Brokate) read the annual report, and officers were elected for the ensuing year.



# CROWN LANDS.

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## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

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## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



28-9-31

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**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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**S. R. WHITFORD.**

*Minister of*



## AGRICULTURAL VIEWS AND COMMENTS.

### MISCELLANEOUS.

#### Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

River Murray, at Renmark, June 18th (Mr. W. E. Meier, Secretary).

Far West Coast, at Ceduna, July 1st (Mr. E. H. Fear, Secretary).

Upper North, at Willowie, July 15th (Mr. H. A. Crisp, Secretary).

The above Conferences will commence at 10.30 a.m. in each case. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

#### The Dairying Industry.

When discussing a paper on "Ensilage and Grassland Management," read by Mr. R. J. Cleve at the Kalangadoo Conference, Professor A. J. Perkins (Director of Agriculture) impressed upon delegates the importance to the State of the dairying industry. At the present time, he said, there was no industry in the State that was more stable. Unfortunately, the number of cows in South Australia had been regularly declining for the past seven or eight years, and now that they were urgently required by farmers it was very difficult to secure cows at a reasonable price. He hoped that farmers and landholders in the South-East would realise the importance of encouraging the industry and would help to breed cows for the use of farmers in less favored portions of the State.

#### Insects in Flour Bin.

The Government Entomologist (Mr. A. M. Lea, F.E.S.), in commenting on insects forwarded to him for identification from "E. B. P.," Murraytown, says the specimens are larvae and moths of the mill moth or meal worm (*Ephestia kuehniella*) which commonly attacks meals and flours all over the world, and is a serious pest in mills. Burning sulphur should not be used against them as the fumes destroy the gluten, and hence bread could not be made from flour so treated. Heating meals and flours to over 160 deg. will destroy all the insects and their eggs, but the dung and webbing would be left behind as well as the bodies of the insects. The only satisfactory way to get rid of them is to destroy such flours or meals as are already attacked and to steam the bin or otherwise heat it in order to destroy all the larvae. The larvae are to be seen in almost every grocer's store in Australia, and in every flour mill, and they are a constant source of trouble wherever flours and meals are stored.

#### Bloodless Castration of Livestock.

Mr. A. H. Robin, B.V.Sc. (Government Veterinary Officer), speaking at Wirrabara Conference on the use of the Burdizzo pincers as a means of castration, said it was a method that could be recommended. It was now in general use by thousands of stock-owners and was giving satisfactory results; in fact many owners had stated that they would not revert to any other method after having used the Burdizzo. There were many advantages in its favor—its cleanliness, speed, it could be used at any time of the year, it made no wound that could be infected with disease or attacked by flies, and there was no bleeding. Not its least advantage was the fact that the animals received slightest setback. Horses after castration with the Burdizzo could return to work in two or four days, and rams were able to get up and walk away.



# Scientific Farming!

**THAT** is the only proper response to present troubles—**THAT** is the road to solvency and restored prosperity. . .

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**White Ants Attacking Trees.**

The Woods and Forests Department advises a correspondent at Kybunga, who asked for information as to the best method of preventing white ants attacking trees, that these pests do not attack healthy, vigorous trees. Where it has occurred, however, it has been stated that sheep dung plastered round the stems has been used with very good results. Sugar or treacle with which arsenic has been blended, if placed in the excavations worked by the ants, will kill off large numbers, for they feed upon it readily, and even eat the dead ants which have first succumbed to the poison, so that their numbers are soon reduced.

**Publications Received.**

Vol. 21, Stud Book of the Australian Stud Pig Breeders' Society, 1931.

Annual Report, Veterinary Department, Nigeria, 1929.

Annual Report, Department of Agriculture, Uganda, 1929.

South Devon Flock Book of England, 1930.

Ayrshire Herd Book of Great Britain, 1930.

New Zealand Romney Marsh Flock Book, 1929.

Overseas Trade for 1929-30, Commonwealth of Australia.

Calendar, University of Adelaide, 1931.

"The Feathered World Year Book, 1931." Price 2s. 6d. Published by "The Feathered World," 9, Arundel Street, London, W.C. 2.

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**AGRICULTURAL INQUIRIES.**


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[Replies supplied by Prof. A. J. PERKINS, Director of Agriculture.]

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**Mixing other Materials with Superphosphate.**

"A. D. H.," Yorketown. *Is it advisable to mix superphosphate with some other material in order to get more regular distribution of relatively small quantities during the current season?* The correspondent suggests the use of—(1) Sea sand; (2) finely ground sea shells; (3) seed gypsum. Reply—Of the three, sand, if sufficiently pure, would be the least likely to affect the water solubility of the superphosphate with which it would be mixed. Seed gypsum would come next, and would indeed have no effect whatsoever unless it contained a certain amount of calcium carbonate as an impurity. Finely ground sea shells would, if left long enough in contact with the 45 per cent. superphosphate, probably lead to a certain amount of loss in the water solubility of the superphosphate due to what is known as "reversion." This reversion, however, would be no greater than what occurs when the superphosphate comes in contact with the moist soil containing an adequate amount of lime.

**Barley on Stubble v. Grass Land.**

*Why is stubble land better than grass land for a barley crop? What rotation of crops and what method of working the land for a hay crop is recommended?* "E. G. B.," Maitland. Reply—The general impression in your district to the effect that a better sample of barley is secured when the crop has been sown on wheat stubbles than when it has been sown on grass land is probably correct. To a very great extent "quality" in the barley sample is affected by what is generally known as the "condition" of the land; that is to say, that land which in any way has been forced to force along a crop and to lead to relative rankness in growth, usually shows inferior quality in the sample of Barley. Probably in this direction the main



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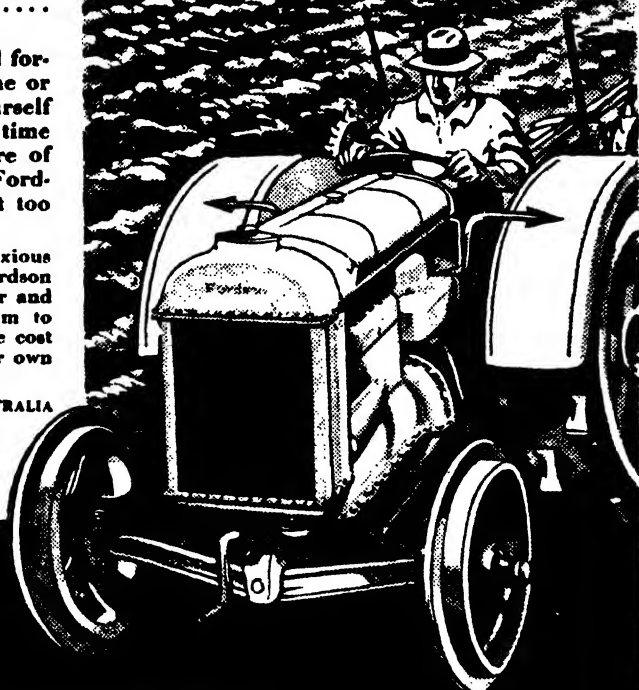
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difficulty is excess of available nitrogen during the growing period of the barley crop, and in this connection, there would usually be less available nitrogen on wheat stubbles than in recently broken grass land.

Preference is for the following rotation:—

Wheat—Barley—Grass—Bare Fallow.

If an oatens hay crop is grown upon stubble, the most effective method of increasing the hay yield would be—

- (a) to sow the oats as early in the season as circumstances permitted; and
- (b) to subsequently topdress the crop after seeding with not less than  $\frac{1}{2}$  cwt. sulphate of ammonia or nitrate of soda.

[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

### **Paspalum and Couch Grass.**

“H. L. L.,” *Inman Valley*, asks information as to the feeding value of *paspalum* and couch grass. Reply—*Paspalum dilatatum* is a strong-growing forage plant of fairly high feeding value, but in temperate climates, and particularly in those parts where the winter is cold, this grass is only a hardy forage plant, giving some feed in the summer which is not very nutritious. Couch grass is extremely hardy, grows well in sandy soils and is very fattening for sheep, but does not produce a great bulk of forage, and is not a particularly good milk producer. Both *paspalum* and couch grass can be established by seed amongst scanty pasture provided—(1) The soil is loose enough for the drill to enter it, and (2) the seed is drilled in to a shallow depth in November after having been closely fed down and when there is enough moisture present to germinate the seed. Better results, of course, follow seeding on properly cultivated land.

### **Waste Currants as Food for Stock.**

“E. C. D.,” *Clare*, asks what is the value of waste currants as a food for livestock. Reply—A sample of currants was submitted to the Director of Chemistry, who has supplied the following analysis:—

|                                         | Per cent. |
|-----------------------------------------|-----------|
| Moisture . . . . .                      | 10.02     |
| Ash . . . . .                           | 2.84      |
| Protein . . . . .                       | 3.89      |
| Fat . . . . .                           | 0.82      |
| Fibre . . . . .                         | 1.47      |
| Carbohydrates (by difference) . . . . . | 80.96     |
|                                         | 100.00    |

It is almost impossible to compare this foodstuff with any of the other well-known foodstuffs because the protein content is so low, and much of the carbohydrates consists of sugar. If the sugar is digestible by farm livestock, currants could be compared with some other feeds, for fattening purposes at all events, on their starch equivalent values as follows:—If maize is worth 81.5, wheat bran is worth 48.1, and the waste currants 75. On this basis, if the currants are to replace maize at £7 10s. a ton, the currants would be worth about £6 17s. a ton, but with bran at £3 15s. a ton the currants would only be worth about £5 17s. a ton. Neither of these comparisons can be taken as strictly correct, because the currants contain so much less protein than the other two foodstuffs. If currants are to be used to full advantage by farm livestock, they should be fed in conjunction with other foodstuffs rich in protein, such as peas, lucerne, subterranean



**Rations for Fattening Sheep.**

*If wethers and lambs are fed heavily on oats and dry feed, is there any danger of impaction and would it be advisable to add linseed nuts to act as a laxative?* "D. A. L.," Auburn. Reply—If the sheep are getting roughage as a picking of dry feed in the paddocks, there should be very little risk of impaction killing or retarding the development of the animals, but trouble might be experienced if all of the feed is carted to the sheep. Sheep nuts would keep the sheep healthy, because of their laxative effects, but they are very expensive when compared to other foodstuffs, and one should get equal results in keeping the animals free from impaction, and at a much less cost, by using bran or molasses. As a matter of fact, there is a foodstuff procurable near Clare, which will probably do the job better than those already mentioned, i.e., the small waste currants held by the Clare Packing Shed. If these can be purchased at a reasonable figure, they could be fed at the rate of  $\frac{1}{2}$  lb. to  $\frac{3}{4}$  lb. per sheep per day, and with some oats as well as roughage, the animals would probably keep in good health and fatten very readily.

**Cultivation of Badly Drifted Soil.**

*A field of fairly firm land which does not usually drift was fallowed and the heavy winds have blown the loose soil from large areas right down to the depth of ploughing. Should the field be reploughed or only cultivated?* Reply—Our experience with areas of fallow which have drifted to the depth of ploughing is that they should be cultivated to a very shallow depth as soon after an autumn rain as is possible. If no heavy-tined cultivator is available to do the job, the plough can be used, but on no account should it be allowed to enter the land to a greater depth than 1 $\frac{1}{2}$  in. When stirred so as to loosen only enough soil to properly cover the seed, it is not unusual to get really big crops from drifted patches, whereas, if stirred deeply, unmellowed soil is brought to the surface and produces poor crops.

**Sodium Chloride, Effect on Cattle.**

*After spraying sodium chloride on blackberries will it have any injurious effect on cattle if they ate same?* Reply—Sodium chloride or common salt would probably kill blackberries if sufficient were used, but it would require such an enormous quantity that the expense would not be warranted. The land would be rendered sterile for some years, but stock would benefit because of the salt. Sodium chlorate, which will kill blackberries when applied as a spray, leads to temporary sterility of the soil, and if good rains are experienced soon after treatment, the soil becomes fit for cropping a few weeks after having been saturated with the chlorate. The small amount present will not injure livestock, although they lick it up greedily.

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**HORTICULTURAL INQUIRIES.**

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[Replies supplied by Mr. GEO. QUINN, Chief Horticultural Instructor.]

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**Explosives for Subsoiling.**

*What experience has the Department of Agriculture had in the use of explosives for subsoiling?* Wirrabara Agricultural Bureau). Reply—Prior to the outbreak of the great war this subject came much to the fore. I have witnessed the use of explosives in a few places—principally in the Adelaide Hills—at Norton Summit, where an old orchard of stunted apple trees was treated, and at Wirrabara prior to planting a new orchard. In the old orchard, four holes were driven to a depth of about 30 in. into the soil.



regular intervals around a tree at a distance of 5ft. from the trunk. In each of these one-half a plug of gelignite was exploded simultaneously. The result was to shake the ground in four overlapping circles, and at the simultaneous discharge the tree appeared to perceptibly lift and settle again. A number of holes were opened up to note the results, and in each case about 1ft. below the surface a cavern about large enough to hold a household bucket was found. This work was done in the autumn when the subsoil, which was of a friable clay with a few loose slaty stones in it, was in a crumbly, dry condition. Cracks extended 1ft. or so around the hole. In some instances, powdery lime was tamped over the charges and an effort made to ascertain if the explosion forced it through the soil. No evidence, however, was adducible from the experiment, which had for its object the possible distribution of fertilisers through the subsoil by such procedure. The old trees were pruned back well, and the hitherto poorly tilled orchard was submitted to good average tillage. The old trees made a good recovery during the two succeeding years, but how much was due to the loosening of the subsoil and fracturing of the root system by the explosives I am unable to say.

The work, preparatory to planting, done at Wirrabara extended over a considerable acreage of land afterwards set to a mixed plantation of stone and pip fruit trees by Mr. H. H. Jericho. These young trees made fine growth for some years after planting, but how they have stood up since through the dry seasons I cannot say. The block is, I think, near Mr. Marner's orchard. In this instance, the procedure was to explode half a plug of gelignite in each position for a tree and at a depth of about 2ft. 6in. below the surface. The exploded spot was barred down to fill in the cavity which formed in the somewhat wetter soil below, and a hole opened above it for the insertion of the tree. Mr. Jericho assured me that each hole cost about 4d. to explode and bar and open ready for the tree, but it is doubtful if that could be done at the present cost of materials and labor.

The opinion I formed from these two widely different experiments was that for an old root-bound orchard, explosives would prove an effective and probably safer substitute for subsoiling by mechanical means. In the case of new land, in the absence of large subterranean roots or solid stone strata, I do not think it could compare with the work done by a powerful caterpillar tractor and very strong subsoiler as made for use with the tractor. Land subsoiled with these implements and cross-subsoiled every 2ft. or 3ft. to break any barriers or ridges makes a much more thorough job than explosives, unless they be used at very close intervals and very great expense. The best job is made when subsoiling by either method if it is done in autumn after the first soaking rain wets the first foot of the land and only slightly damps the lower strata.

#### **Transplanting Mature Fruit Trees.**

*What is the best plan to adopt to transplant an eight year old pear tree?* (Jamestown Agricultural Branch). Reply—An eight-year pear tree may be removed quite safely under suitable climatic conditions, but it is a very risky proposition in hot, dry, and wind-exposed localities. Unless immediate removal is contemplated, the best method to adopt with an established fruit tree is to dig a trench around the tree a couple of feet from the trunk and deep enough to sever all large roots. At the same time, cut the tree back almost on to its main arms. Fill the trench with rich soil or soil enriched with plenty of old rotted manure; tramp fairly firmly and soak with water. This work should be done about the end of March. During next season the tree should be watered well and encouraged to grow throughout the summer. Next March, if the ground be opened up outside the previous trench, it will be found that the enriched soil has become filled with fibrous roots, which, if well moistened, will hold much of the soil in a ball to be carried with the tree. A good plan in lifting the tree is to split a strong sack down one side and end, and then, when excavating beneath the ball of soil, gradually work this under it. If a heavy ball is secured, a man grasps each



corner of the sack and the tree is carried bodily to its prepared position, which should be a hole larger and deeper than the ball. The sack is buried where it lies beneath the ball, the hole being filled with enriched soil, and the whole trodden firmly and afterwards soaked with water. A screen of bagging or boughs stretched on stakes a couple of feet above the top of the tree affords considerable help in enabling it to recover and progress through the first year after the removal. Old stone fruit trees, as a rule, do not stand removal so well as apples, pears, quinces, figs, oranges, and lemons. A less satisfactory method is to excavate the tree, saving most of the larger roots for several feet in length. The top is cut back as severely as in the previous method. The best time to move established trees is in the autumn or very early winter whilst the soil is warm. It is always desirable to tramp the enriched soil well down over the roots and settle the ground with a thorough soaking. In all but the coolest districts, the transplanted tree should be shaded throughout the first summer and protected against drying winds whether cold or hot.

#### Kopi for Tomato Plants.

“J. H.,” *Poochera*, asks whether *Kopi* is suitable for growing tomatoes and how to apply it? Reply—This is not a plant food, but is very useful in the fine form for flocculating stiff clay soils and making them more friable. Only in liberating natural potash, and in this way, could it prove beneficial to tomatoes and other garden crops. Lime compounds are usually spread on top of the roughened surface and lightly harrowed or raked in. Early in winter is the best time to do this, so that the rain may set on the land and distribute the lime between the soil particles. From about one to five tons per acre may be safely used on stiff garden land.

#### Cabbage Blight and Aphis.

*What is an effective remedy for blight in cabbages; also a cure for aphis?* (Kelly Agricultural Bureau). Reply—The term “blight” amongst gardeners is generally applied to the cabbage aphis. If that is meant in this case, the remedy quoted below would answer the latter part of the query also. Aphides are usually killed by contact sprays such as oil emulsions, nicotine and soap compounds, resin or starch solutions, all of which act upon the skin or stop up the breathing pores of the pest. Nicotine dusts are also destructive when containing not less than 3 per cent. of nicotine. Probably the best spray is made from nicotine sulphate (Black Leaf 40 is a popular form) which is used at the rate of 1 pint in 80 pints of soapy water. It is very important to strike the individual insects with the sprays or dusts and not apply them at random to the plants.

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## DAIRYING INQUIRIES.

[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor.]

### Feeding Cows and Pigs.

*I have liberal stocks of wheat, barley, and oats on hand. Will you advise the best method to adopt to feed the grain to cows and pigs?* "J. M. G.," Goolwa. Reply—For a cow giving about 3galls. of milk per day a ration consisting of 3lbs. oats, 3lbs. barley, and 2lbs. linseed meal will give good results. Make a mixture up of six parts oats and barley mixed and two parts linseed meal and feed this mixture at the rate of 1lb. of the mixture to each 4lbs. of milk the cow produces per day. Grind the barley for the pigs and feed it dry. If skim milk is available for the pigs, they will do well on a ration of wheat five parts, barley two parts, and oats two parts, or, if the oats are kept for the cows, feed five parts wheat and three parts barley, crushed and fed dry. Give all skim milk available. Oats are of advantage to brood sows. It will be found most economical to feed as much grain as the pigs will eat readily. Self-feeders will be found most satisfactory in the long run.

## POULTRY INQUIRIES.

[Replies supplied by Mr. C. F. ANDERSON, Government Poultry Expert.]

### Chicken Pox.

*The Secretary, Shoal Bay Agricultural Bureau, reports blotches on heads of birds which gradually spread into one large scabby swelling. The mouth is ulcerated, and the birds are badly scoured.* Reply—The disease is chicken pox which has spread to roup. Birds which are badly infected in the mouth should be killed and carcasses burnt. A simple remedy is to paint the affected parts with iodine—three applications should be sufficient—or ordinary washing blue can be rubbed on the affected parts. Spray all roosting quarters once a week with a 10 per cent. solution of kerosene emulsion, and feed Epsom salts at the rate of 1oz. per 20 birds in a mash once a week.

### Round Worms.

*A. E. W., Waikerie, reports—I am losing a number of chickens when they reach the age of three months. The birds are continually straining their necks and opening their beaks as if gasping for breath.* Reply—The complaint appears to be round worms. The fact of the birds stretching their necks is an indication of worms. It will also be noticed that the droppings are of a yellow color. Treatment—Either feed chopped onions at the rate of 7lbs. per 100 birds once a week, or mix 1 tablespoonful of turpentine to four of olive oil for each 20 adult birds, and add to the mash, or obtain Nema worm capsules from any poultry supply store and use as directed.

## VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

*"G. L. T.," Brentwood, has mare 11 years old "gone down" twice since Christmas and evidently with severe colic pains.* Reply—The trouble with the mare appears to be chronic indigestion and this is due most probably to either bad teeth or to over- or perhaps a combination of both. The following treatment is suggested:—  
 1. Have the mare's teeth attended to; starve her for 16 to 24 hours and give the following:  
 2. New linseed oil 1½ pints, turpentine four tablespoonfuls; keep on bran



mashes for three or four days afterwards, and if a good purging does not result, repeat the doses of oil and turps. Subsequently limit the feeding of the mare somewhat and give one tablespoonful of *liquor arsenicalis* (Fowler's solution) in the feed night and morning for a fortnight. If a little green feed could be included in the daily ration it would be beneficial.

"L. J. M.," *Delamere*, asks what is the correct amount of *Spanish fly* to give to a lazy ram? Reply—The use of drugs such as "*Spanish fly*," &c., is not recommended as it is doubtful if they will effect the desired result, and it is quite likely that they may produce permanent harmful results if not used with the greatest caution. It is far more satisfactory to stimulate the rams by hand feeding them on a ration of oats, barley, or other grain. If their indolence is due to their being over fat, their condition will require to be reduced gradually without weakening them. An ounce of Epsom salts in warm water as a drench once a week, with judicious curtailing of their feeding for three or four weeks, will serve to reduce them to a more satisfactory condition for mating.

"A. E. S.," *Mount Cooper*, has cow, udder swollen and inflamed and difficult to milk. Reply—The cow is suffering from *mammitis* or inflammation of the udder. The following treatment is advised:—Foment affected quarter two to three times daily. After each fomentation, dry and massage gently with warm camphorated or olive oil. Strip out as often as possible during day. Isolate cow and milk strippings into a tin containing disinfectant. If no response to treatment in a reasonable time, dry affected quarter off, or if more than one quarter is affected, sell cow for beef. If milk from other quarters is normal, it can be used.

"C. J. W.," *Port Lincoln*, asks can bones of a fox poisoned by strychnine 12 months previously poison a dog? Reply—Strychnine poisoning is a rapid poisoning. In fatal cases, the strychnine is found mainly in the blood, liver, and kidneys. It is not considered that the bones, especially after a period of 12 months during which time they would be exposed to considerable weather changes, would be fatal to a dog.

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"E. H. P.," *Rockleigh*, reports (1) ewes close to lambing showing signs of stomach worms, (2) treatment for cow with cow pox. Replies—(1) Ewes can be dosed for worms a month before lambing. Handle carefully and dose in the standing position. Copper sulphate solution is recommended. (2) The local signs of "cow pox" are as follows:—The udder and teats become inflamed and the latter are swollen. A pale red eruption appears irregularly distributed on skin of part. In a few days blister-like vesicles form, circular or oval in shape. These vesicles are surrounded by a red inflamed zone. In about 10 days they turn into pustules which are followed by scabs. Milkers' hands and arms may become infected. Treatment consists in washing area with a weak solution of lysol, and subsequently dressing with boracic acid ointment. Affected cows should be milked last and isolated if possible. Milkers' hands should be washed.

"K. H. D.," *Black Springs*, reports cow with swelling at back and both sides of jaws. Reply—If swelling is firm it is suggested that it be fomented daily and painted with strong tinct. iodine. In the event of its breaking, syringe out with iodine. If swelling is soft and flabby, it is probably due to the poor condition of animal. In this case a purgative drench of Epsom salts should be given and cow subsequently fed on good quality feed, including bran.

"W. L. E.," *Ceduna*, reports death of cows. Post mortem showed a number of bones and nails in the first stomach. Reply—The post-mortem finding shows that the cows must have been "bone chewers," and this habit is frequently the cause of a disease known as botulism. This disease is really a poisoning, and cows usually obtain the poison from old bones or rotting carcasses. Bone chewing is an attempt on the part of the animal to obtain the mineral matter which is lacking, especially during the dry period of the year, in their feed. Treatment of cases of botulism is not satisfactory, and consists briefly in giving (1) a purgative drench of Epsom salts, (2) powdered nux vomica (a teaspoonful night and morning for 10 to 14 days), (3) the addition of mineral matter to the ration. Prevention is more important, and can be satisfactorily carried out by—(1) Collecting all old bones and burning or burying them deeply. (2) Supplying a mineral ration free from the poison of botulism. The following mixture is recommended:—Finely-ground Nauru or Ocean Island rock phosphate, 1 part; coarse salt, 1 part. The mixture can be mixed in the damped feed of cows which are being hand fed. A handful three times weekly is suggested. For dry and young stock put in troughs near watering place. It is suggested that in this case a little crushed oats and linseed meal be added to make the mixture more palatable.

Bloat in Sheep and Cattle.

"Bloat in sheep and cattle," said Mr. A. H. Robin, B.V.Sc. (Stock and Brands Department), at the Wirrabara Conference, "could be traced to a number of causes—such as eating indigestible feed, overfeeding, sudden changes of feed—especially from dry to green feed—and turning stock in hungry condition in to graze on wet grass, especially clovers and lucerne. Prevention of the trouble lies in avoiding the above causes. In cases which were not particularly severe—where the animal could still breathe with the mouth closed, relief could usually be obtained by medicinal measures alone. Rounding the animals up and driving them would often relieve the symptoms. In cows, a piece of rope smeared with grease or tar placed in the animal's mouth would often result in the gas being expelled from the paunch. Cattle could be given $\frac{1}{2}$ lb. soda in a drench—sheep up to $\frac{1}{4}$ lb. A teaspoonful of dry mustard on the back of the tongue was a useful remedy in sheep. The most efficient remedy of all, if it was obtainable, was to give cattle 8 teaspoonfuls of turpentine and 1 to 2 tablespoonfuls of cloudy ammonia in a pint of milk. Sheep could be given up to 4 tablespoonfuls of turpentine and $\frac{1}{2}$ to 1 tablespoonful cloudy ammonia.

"In severe cases it was necessary to puncture the left flank at a point equidistant from the point of the hip, the last rib, and the backbone. If no trocar was available, a pocketknife could be used. When the knife had been inserted it should be turned

edgeways, and a piece of cork or wood placed in the puncture to hold the lips of the wound apart and allow the gases to escape from the paunch. The drench of turps and ammonia could then be given to prevent further fermentation of the food.'

Licks for Stock.

Replying to a question as to a cheap and suitable lick for stock in the Lower South-East, Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department, said the Council for Scientific and Industrial Research, which controls the experimental work at Dismal Swamp, recommends the following lick:—Salt, 40 parts; dicalcic phosphate, 60 parts. If desired, about 10 per cent. molasses can be incorporated in this mixture. The cost of the dicalcic phosphate is 15s. per cwt., or £15 per ton, f.o.b., Adelaide.

Lung Worms in Sheep.

The following remedy for lung worms in sheep, a subject which was discussed at the South-Eastern Bureau Conference, was advised by Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department.

The most prominent symptom is an irritating paroxysmal cough, accompanied by a frothy discharge from the nostrils, this discharge often being bloodstained, due to haemorrhage from the lungs. Usually a number of animals in the flock are affected at the same time.

If the sheep are badly infested, they further fall away in condition, even though they continue to feed well, and become anaemic and unthrifty. Death may ultimately result from exhaustion due to the increasing poverty of condition, or the sheep may die suddenly from suffocation, due to accumulated masses of lung worms and mucus blocking up the air tubules of the lungs.

Where the sheep are infested with the smaller variety of lung worms, which lodges more in the lung tissue, the symptoms of bronchitis (i.e., the coughing and frothy discharge) may be less pronounced, but the animals may develop symptoms of pneumonia.

The only method of treatment that is to any extent successful in removing the worms out of the bronchi or larger air tubes is the intratracheal injection of certain drugs. However, these injections require skill, and entail a good deal of trouble in their administration, and are not without danger to the sheep; consequently they should only be attempted by a veterinarian. This, of course, at once limits their application to small flocks, and where the worth of the animals affected warrants the expense of getting the necessary veterinary assistance.

Lung worms are, however, seldom found alone in sheep, but are usually accompanied by stomach and intestinal worms, so that the flock should be subjected to the regular monthly treatment with either Bluestone or Carbon Tetrachloride, as prescribed for these parasites. By removing them, the sheep will have only the one enemy (viz., the lung worm) to contend with, and will usually do better and improve in condition, so that losses are minimised. Of the two treatments mentioned, probably the Carbon Tetrachloride treatment will be found to be somewhat the more efficacious. The affected sheep should, of course, receive a plentiful supply of nutritious food, so that their bodily resistance to the ill effects of the lung worm may be increased.

Generally speaking, the only efficacious method of combating the lung worm in flocks lies in prevention, and the precautions that have been advised repeatedly from time to time with respect to the combating of stomach worms apply with equal force in respect to the lung worm, which, like the other, is picked up by the sheep in their feed and drinking water. Overstocking of pastures should be avoided, pasture rotation should be practised to the greatest possible extent, and the sheep should be given a clean water supply, free from possibility of contamination with worm eggs and larvae.

Special care should be taken with young sheep, as they are more likely to suffer ill effects than more mature animals if they become infested.

Newly purchased sheep, that are likely to be clean at time of purchase, should not be allowed to depasture on paddocks recently occupied by lung worm infested sheep.

HANDLING OF CITRUS FRUIT FOR EXPORT.

The Citrus Preservation Committee of the Council for Scientific and Industrial Research recently drew up recommendations for the procedure to be followed in the handling of citrus fruit for export. This work of the Committee was carried out on the understanding that in the near future the production of citrus fruit in Australia would be much greater than local requirements and that efforts were being made to build up an export trade on a large scale.

The recommendations embodied the results of the experimental work of the Committee and of the experience of its members. As the Committee was made up of members who were concerned with the growing, transport, and marketing of oranges, as well as of scientific workers, every aspect was taken into consideration in view of the necessity for the fruit being in a satisfactory condition if the export trade was to be a success.

The recommendations were as follows:—

A. Regulations affecting Export.—All fruit must comply with the regulations under the Acts dealing with the overseas export of fruit and in particular those relating to the control of the quality and the grading of the fruit, the type of case, and the markings on the case.

B. Type of Fruit.—In view of the fact that the regulations set out in detail the type of fruit permitted for export, there is not much that can be added under this heading. It is only necessary to emphasise that only first quality fruit should be sent. The harmful effect on the trade would be very great if sour or immature oranges were included.

C. Methods of Handling in Groves.—During all operations it is most important to avoid injury to the rind. All experiments have definitely pointed to the necessity for great care in the handling of the fruit. Considerable loss is produced by mould infection following damage to the rind, and this damage can be prevented by careful handling in the following manner:—

- (1) Gloves should be worn during all operations of harvesting, grading, and packing.
- (2) Under no circumstances should the fruit be pulled from the tree.
- (3) Blunt-nosed clippers should be used, and in the actual cutting of the fruit the greatest care must be taken that no protruding stalk be left. It may be necessary to make a second cut in order to remove any superfluous wood.
- (4) No fruit resting on the ground or hanging within a foot from the ground should be used for export.
- (5) The fruit should not be harvested in damp weather.
- (6) Picking bags are not recommended as the ideal receptacle, because in a bag oranges are liable to be rubbed together and the rind bruised by the movements of the packers. It is strongly recommended that growers make an effort to provide the pickers with a box of the capacity of half a bushel; the box should be well padded inside and have straps for hanging across the shoulder.
- (7) Care should be taken to see that the fruit is not dropped, but transferred from one receptacle to another with the same care as would be given to eggs. If any orange is accidentally dropped or mishandled in any way during the operation, it should be immediately rejected, as otherwise it may be the means of ruining a whole case of fruit.
- (8) The most suitable type of field box is the box used in the canning industry, namely, a kerosene case cut open on one side with cleats nailed to each end for ease of handling.
- (9) Care should be taken to see that the field boxes have no inner surface projections of any kind; there should be no nails, protrusions of wood, or sharp knot holes, all of which are liable to cause injury to the rind.

- (10) If the weather is dry and warm, sweating in a well ventilated shed is recommended for a period of up to seven days. Under moist conditions, however, sweating will be quite ineffective and therefore is not advised unless some chamber in which atmospheric conditions can be controlled is available.
- (11) In transporting the fruit from the grove to the shed, care should be taken to pack the boxes squarely on top of each other, and the truck should be driven carefully so as to minimise the shaking as much as possible.

1. *Packing House Methods.*—The importance of scrupulous cleanliness in the packing sheds and of all parts of the machinery used cannot be over emphasised. To ensure this, the following precautions should be taken:—

- (1) Old fruit should not be left lying about. All mouldy or damaged fruit should be removed from the shed and destroyed.
- (2) The grading machine should be sprayed daily with a formalin solution of 1 part of 40 per cent. commercial formalin to 20 parts of water.
- (3) Where practicable, the whole of the shed should be sprayed at intervals with this solution. The floor in the vicinity of the packing operations should always be regularly sprayed.
- (4) Gloves should be worn during all sorting, grading, and packing.
- (5) It is important that the grading machine should be free from all rough, sharp edges or projections or surfaces which might injure the fruit.
- (6) It is essential that the fruit should be carefully culled and that any which shows marked signs of blemish should be rejected. Off-type fruit should be rigorously excluded.
- (7) Dirty fruit should under no circumstances be exported. Cleaning may necessitate washing and polishing, and unless the proper facilities exist for efficient washing and quick drying of the fruit, washing should not be attempted and all dirty fruit should be discarded. Where proper facilities for washing exist, the sodium bicarbonate treatment is recommended, as it is beneficial for reducing the decay due to moulds. This consists in immersing the fruit in 5 per cent. sodium bicarbonate for eight minutes at temperatures of 112° to 120° F. and drying on towel dryers. For efficient drying after this treatment, loose towels should be placed on the fruit as it passes over the revolving towel dryer. The revolving towel soon becomes so wet that it does not dry the fruit, but merely removes the excess of moisture. If dry towels be tacked on the machine so that they rest loosely on the fruit the efficiency of the apparatus is increased enormously and the fruit can be actually dried. These loose towels, which should be made to fit the machine, need to be changed and dried as soon as the condition of the fruit points to the necessity.



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- (8) Only export citrus cases (23 x 11½ x 11½ inside measurements clear of a division) should be used. The space between the side boards must not be more than ¼ in. Each case should be dressed particularly on the inside and be free from projecting nails, loose splinters, or anything that might injure the fruit.
- (9) In packing, great care should be taken to see that the fruit is to the correct height in the case in order that "lidding" can be carried out without damage to the fruit. The use of box guards on the middle division piece and round the inside is recommended during "lidding" in order to prevent injury.
- (10) The experiments of the Committee have not as yet gone far enough to recommend a definite method of wrapping. It is considered, however, that wrapping in an attractive paper is advisable, in that it enhances the selling qualities very considerably.

E. Transport by Rail.—The cases should be carefully packed in a railway truck in such a way that undue movement is prevented. They should be stacked on end, and for preference should be battened, but if battening is impracticable the cases should be stacked in such a way as to prevent as much movement as possible. Cleanliness in the trucks is as essential as in the packing shed.

F. Pre-cooling.—Broadly speaking, all fruit consists of living matter and materials which have been stored up in the fruit during the period of growth on the tree. After the removal of the fruit from the tree, the living matter is dependent for its maintenance upon the materials stored up, and when these are used up the fruit dies. The life of the orange, therefore, is limited, depending upon the quality of stored material and on the rate at which this material is used up.

The vital activity of the fruit depends upon its temperature, increasing with rise of temperature at an accelerated rate, and the object of storage at a low temperature is to reduce its rate of living and so prolong the life of the fruit. This using up of stored material is accompanied by actual production of a proportional quantity of heat, and so if the fruit be loaded hot into the ship's hold, the refrigeration machinery has to remove not only the heat already in the fruit, but also heat which is constantly being produced. It may, therefore, be some time after loading before the temperature at which it is desired to carry the fruit is attained throughout the stack. This means that the life of much of this fruit is shortened.

All fruit should therefore be pre-cooled to 40° F. before being loaded into the ship, since pre-cooling lowers the rate of living and thereby lengthens its life. As oranges have only a limited life, it follows that all time taken up after picking, sweating, packing, &c., is so much time taken off the storage life of the fruit, which really starts when the fruit is removed from the tree. It is, therefore, essential that the fruit should reach the pre-cooler as soon as possible after picking, so that the vital activity, and therefore the reduction of its stored material, is reduced to a minimum.

G. Ship Transport Conditions.—The temperature of storage on the ship should be 38°, and the holds should be subject to periodical ventilation.

General Instructions.—It has already been stated that the life of the fruit from the time it leaves the tree is strictly limited, and any unnecessary delay between the time of harvesting and the time of sale means a shorter time during which it will be in good marketable condition.

It is, of course, manifestly impossible to make arrangements for a shipment of any size without at least some of the fruit having been harvested earlier than the rest. As, however, the process of decay is very much slower when once the fruit is in cool storage, it is essential that the actual processes of harvesting, washing, packing, and transport to the cool stores must be managed as expeditiously as possible. If the fruit must be held for some time before shipment, it should be held in cool store and in the packing shed.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR APRIL.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

The special work of the month should be an attempt to control plant pests, both insect and fungous. Codlin moth may be considerably lessened by destroying all wind-fall fruits, by boiling them for pig feed, or by burying them deeply; this procedure will also tend to destroy much of the fungus spores adhering to the fruit. Use bandages about the trees which were infested by codlin moth and examine them within the next month or two, destroying the contents, and storing the bandages for future use. Spray all trees subject to fungous diseases either with lime-sulphur or Bordeaux mixture, and at the same time direct the spray on the fallen foliage.

When filling blanks in the orchard, dig the holes, and provide fresh soil for the young tree. For new plantings, the holes should be ready to receive the trees at the earliest opportunity.

Pruning may be commenced so soon as the foliage has finished its work; in any case remove dead limbs, clean the cuts, and paint with thick white paint or white lead. The dead cuttings should be collected at once and burned. Vine pruning may also be started where the foliage is done.

As soon as the harvesting is complete clean all the picking outfit and boxes and repair where necessary, then store away until next season; all the drying outfit should be treated similarly.

Protect young citrus trees from possible frosts or extreme cold by wrapping hessian or paper about the stems, and keep the soil loose.

Get cover crops in at earliest moment, manuring them with super or bonedust, and use a little potash about trees which have shown a tendency to "scorch"; $\frac{1}{2}$ lb. to 1 lb. per tree will be sufficient, ploughed in when putting in the crop, or dug in.

See that surface drains are in order and arrange to prevent washaways if possible. Outlets of underdrains must be kept free, to keep them from silting.

Hoe strawberry beds, and make sure that water will not lie about the plants.

Have ploughs and other implements for cultivating in readiness for use.

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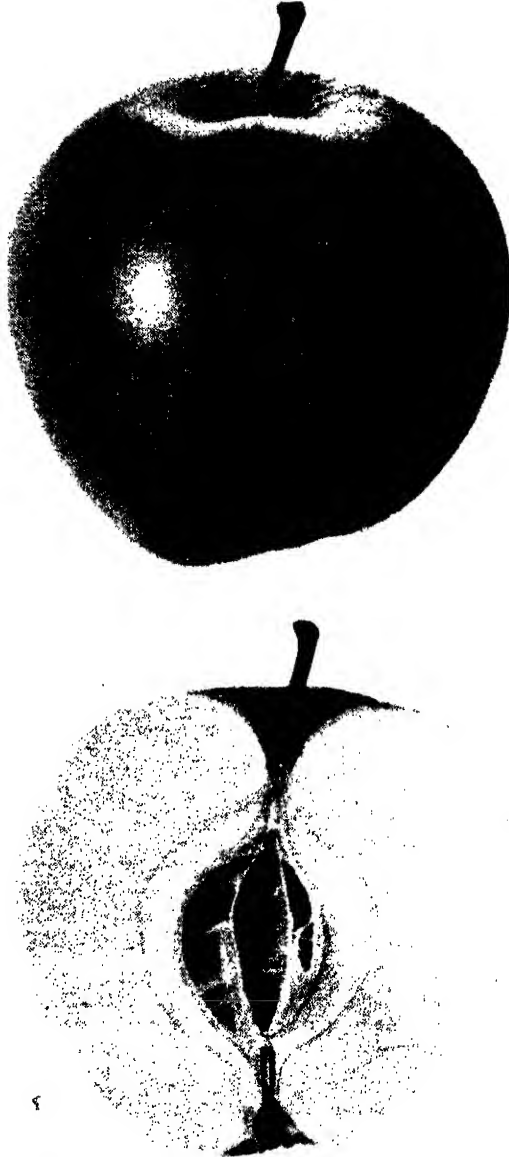
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THE ORIGIN AND HISTORY OF THE CLEOPATRA APPLE.

[By GEO. QUINN, Chief Horticultural Instructor.]

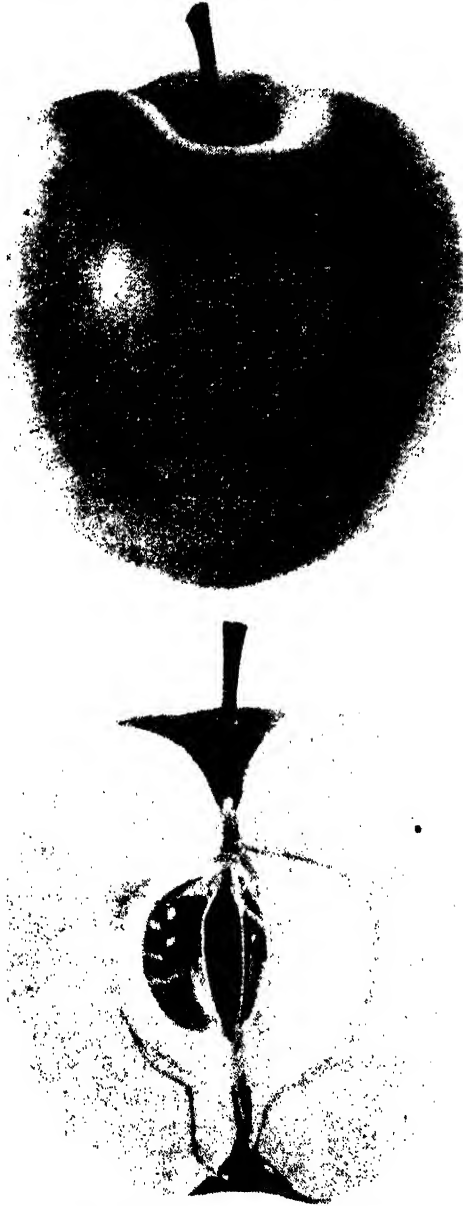
Although this apple holds a prominent position amongst the varieties grown for export and home consumption in all of the apple-growing States of the Commonwealth, its origin has been largely treated as a matter for conjecture amongst pomological students and nurserymen in Australia.



CLEOPATRA APPLE from South Australia (natural size).

Judging from the aged trees found in the apple-growing States, it has probably been grown here under various names from a period extending back into the middle of last century. In Tasmania it has been known as the New York Pippin, and in this State

—more than half a century ago—it was marketed as Pomeroy, but the origin of the present name of Cleopatra appears to be as uncertain as the origin of the variety itself. Although the name of Cleopatra was adopted by the now defunct Pomological Committee of Australia, which achieved a good work in unravelling the nomenclature of many of our apples and pears, that body did not attempt to trace out the origin



ORTLEY APPLE from Oregon, U.S.A. ($\frac{1}{2}$ natural size).

and history of this apple. It is true brief references may be found in catalogues, or statements made by nurserymen and horticultural writers of 50 years ago asserting or hinting that the variety was a synonym of the American apple called Ortley, but if they were in a position so to do, they produced no convincing evidence substantiating that contention.

In the "Fruit World of Australasia" for August, 1929, on page 289, a Mr. L. C. Tonkin, of Otago, New Zealand, referred to the Ortley apple grown in the north-western States of America as being synonymous with "our Cleopatra." This reference came under the notice of Mr. H. P. Gould, Senior Pomologist in the Bureau of Plant Industry, at Washington, U.S.A., with whom I had previously held correspondence relative to the nomenclature of fruits. Writing in October, 1929, Mr. Gould asked if I could throw any light on the origin and history of the apple grown in Australia and New Zealand under the name of Cleopatra, as that name was not known in American pomology, and considerable doubt was still attachable to the synonymy indicated by Mr. Tonkin. He expressed the opinion that the point could only be permanently and definitely settled by critical comparisons of authentic specimens of the fruits being made side by side.

In acknowledging Mr. Gould's courteous inquiry, it was suggested he endeavor to procure and cold store typical specimens of the Ortley fruits grown in the United States of America, and we would dispatch specimens of our Cleopatra fruits to Washington as soon as they were sufficiently developed to mature on the journey. This course was followed, and in April, 1930, two small parcels, containing fruits of Cleopatra displaying the variable shapes and sizes it assumes in this State, were dispatched. These, with one exception, came into Mr. Gould's possession in an excellent state of preservation on May 22nd following. They were critically examined by the scientific staff of the pomological division of the Bureau of Plant Industry, who, after minute dissections were made, unanimously declared them to be identical, in their opinion, in every particular with the fruits of the Ortley, which had been stored for the purposes of comparison.

Paintings in water color were made, both of the South Australian and American specimens, and photographic reproductions developed therefrom. At the same time, technical descriptions of the structural characteristics of the fruits were compiled.

Through the courtesy of Mr. Gould, specimens of these prints, together with copies of his technical notes, have reached this office, and proved a source of much interest to many local growers of the Cleopatra apple. From these pictures one of a fruit from each country displaying an apple in general elevation, and in longitudinal section is shown herein, and the resemblance is very closely defined. At the same time, Mr. Gould sent along a copy of a contribution he was making on the subject to the "Better Fruit" magazine and to "Fruits and Gardens"—the latter being the official organ of the American Pomological Society. These studies into pomological nomenclature and synonym were printed in "Better Fruit" for October, 1930.

Finally, in keeping with an earlier promise, Mr. Gould dispatched in December last a box containing three specimen apples of the Ortley as grown in the famous Hood River Valley, in Oregon, and four others obtained from the New York Experiment Station Orchard, at Ithaca, New York. These arrived in Adelaide in a splendid state of preservation early in February, 1931. The fruits from these widely separated districts in the United States of America externally presented those differing characteristics which can be observed between the Cleopatra when grown in Tasmania and when produced in the warmer parts of this State. They have been shown to a great number of our principal growers of the Cleopatra and students of pomology from various districts of this State, who, without being informed of their origin, have, without exception, pronounced them to be identical with our Cleopatra apples.

Some of the specimens have been dissected and tasted in this office, and, allowing for differences due to condition, I am thoroughly convinced our well-known Cleopatra is none other than the same variety which is recorded in pomological literature as having originated in the orchard of Michael Ortley, in Southern New Jersey, U.S.A., and was first described in America by Coxe, in 1817, under the name of Woolman's Long Pippin, and which was sent to the Royal Horticultural Society of England by a pomologist named Floy in 1825 under the name of Ortley. W. H. Bagan, of the Bureau of Plant

Industry, at Washington, U.S.A., in his comprehensive catalogue of varieties referred to in American publications from 1804 to 1904, entitled "Nomenclature of the Apple," cites some 30 synonyms for this variety in America. Mr. Gould advises me it is widely scattered through the United States of America, but commercially grown in the north-western States only. Nowhere is it placed in the group of leading varieties.

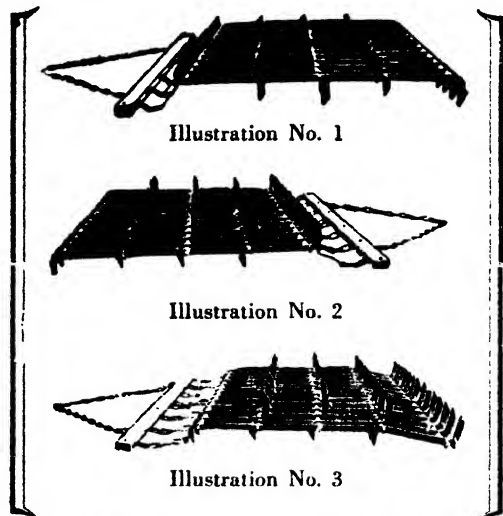
In describing the characteristics of the Cleopatra tree in this correspondence, reference was made by me to the susceptibility of its fruits to the Bitter Pit or Baldwin Spot when grown in certain of our districts. In commenting on this Mr. Gould wrote, "I am surprised to know that this variety is susceptible to Bitter Pit or Baldwin Spot, as the disease is commonly known in this country. I am, however, not aware that it is not noticeable in sections of this country where it is grown."

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CONFERENCE OF SOUTH-EASTERN BRANCHES.

The following papers were read by members of South-Eastern Branches of the Agricultural Bureau at the Conference held at Kalangadoo on March 18th:—

ENSILAGE AND GRASSLAND MANAGEMENT.

[By R. J. CLEVE, Mount Gambier.]

In submitting this paper to Conference, I wish to impress upon farmers the advantages that have resulted from grassland management to the dairy farmers of New Zealand. The intensive system wherever it has been adopted has almost doubled production, and is rapidly gaining favor in other dairying lands throughout the world. By this means land which would otherwise have been non-productive has been utilised to its full productive capacity. The fundamental and essential basis of grassland farming is rotational grazing. The next, and certainly the most influential factor, is the use of fertilisers, but no matter how liberally applied, it will never be used with any great amount of success unless the increased growth or herbage is effectively controlled. The only method in which this can be accomplished is by the new system of rotational grazing. In New Zealand, where this system has been extensively practised, the four main processes used in operation are:—1. Subdividing of paddocks. 2. Making of ensilage. 3. More complete harrowing. 4. Top-dressing..

The subdividing of paddocks into smaller acreage has a distinct advantage inasmuch as it makes for easier working and more complete control. Heavy stocking—being one of the phases of rotational grazing—the pastures are consequently more evenly eaten down (a very important point), than would be the case in paddocks containing 10 to 20 acres. In paddocks of this size, much loss in feed is occasioned by cows grazing on sweeter and neglecting the ranker patches of pasture, especially where droppings have accumulated and have not been spread by harrowing.

Under the new system of grassland management, the average area of paddocks is from 4 to 6 acres. These paddocks are top-dressed in the spring with an average of 3cwt. to 4cwt. of fertiliser to the acre. This again is carried out in autumn, when another dressing is applied. This dressing usually consists of super, with a basic or potash percentage, and about 3cwt. of lime. It is from August to December—the flush months of feed—that the advantages of this method of control are brought out more than ever. During winter the herd is turned into the biggest paddock on the farm and fed a balanced ration of ensilage and hay. Previously, all paddocks have been top-dressed and shut up. With the approach of August and spring grasses, each cow as it comes in is turned on to a clean, fresh pasture and left until the grass is thoroughly eaten down hard, after which the herd is then moved on to the next paddock. This method is continued until the herd has rotated round all the paddocks that have been set aside for the principle of rotational grazing. By then sufficient time will have elapsed for the first paddock to have recovered its growth and the grass will once again be available for grazing. Harrowing is a very important link with rotational grazing, and each vacated paddock is thoroughly harrowed to scatter droppings after the herd has passed through. Too much harrowing cannot be practised, for it is imperative and essential to vigorous and continuous growth of plant life.

The main factor is never to allow the pasture to grow beyond the leaf stage. In paddocks which have been more liberally treated with fertiliser, it is impossible to keep the herbage down even with hard stocking. When such cases occur, the paddock is mowed and the surplus converted into ensilage.

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The use of sheep as followers after the cows is of vital importance to grassland farming. To maintain pastures in their most profitable condition, a number of sheep following on vacated paddocks will eat down surplus grass left by cows, and in doing so, effectively do the work of preparing for another crop of grass. Experiments have shown that where sheep have not been used as followers, the heavy harrowing and rotational system are likely to cause conditions suitable to the growth of pasture plants that are not altogether desirable.

The only serious drawback to the use of sheep is the fact of increasing the demand for food during winter, when the growth of grass is at its lowest. This can be easily overcome by making ensilage.

ENSILAGE.

The making of ensilage, another process in rotational grazing, is a most vital requirement for effective grassland management. In making ensilage it is optional as to whether a pit or a stack is used. Personal experience has taught me that a pit dug in the hillside is more suitable, for there is a minimum of waste, heat is more permanently retained, greater freedom from wind and rain, and also more liberties can be taken in filling. A great mistake is to make the pit too narrow. There is more waste in proportion than there would be in a big pit, with the result that the ensilage cools down more quickly and deteriorates. Another mistake often made is ensiling too slowly. When beginning the stack or pit, it is advisable to work on small areas, cutting only sufficient that can be stacked or pitted that day. The best plan to adopt is to cut in the morning and stack in the afternoon. No time must be lost after the grass is cut before getting it into the pit or stack. This must be well tramped and sufficient time elapse in order to generate heat. On clear fine days 24 to 36 hours are sufficient, but on cold or wet days longer times are necessary. Once heat is generated in the lower portion of the stack, no time should be lost until filling is completed. If too much spelling is indulged in—and especially if the material used is dry and overgrown—wilting and overheating will occur, with the result that the ensilage becomes overcooked. Overheating can be partially controlled if the grass is cut in the leaf stage, stacking as quickly as possible, working on small areas, and well tramping the outer layers to the exclusion of air.

When filling the pit or stack, a common mistake is to keep dumping material in the one place all the time. The majority dump it on the sides. This continual dumping in the one place will cause the grass to become more compressed on one side, causing a distinct cant. This will create an air pocket, a thing that should be avoided. When filling, it is a good plan to keep dropping the material in the centre; this will have the effect of creating a crown, and as each load is dumped, it is essential that it be well tramped, especially along the sides and ends. Insufficient pressure on top is a common fault in most ensilage pits or stacks. The greater the pressure, the better the silage. In ensilage that has been made with mature grass or *paspalum*, heavy weighting is imperative, and at least 12 in. of earth or clay is needed. In every case it pays well to weight the stack heavily.

Making ensilage from grasses in its best producing stage is nearly as good as grass itself, and in making it early means that pastures are kept in a better grazing condition than when grass is allowed to develop to the full flowering stage. Another thing in its favor is that it will not leave a hard stubble, which is generally left after a mature crop is cut, and which tends greatly to retard the following growth.

The great advantage of the small field when it comes to ensilage making is that it can be spared from the scheme of rotational grazing, and with many small fields, each can be shut up and cut in succession to give ensilage material at the right time for continuous filling. If good results are to be obtained, consideration must be given to

early closing of paddocks, so that the ensilage may be made as early as possible during the flush months of feed. This will not be only of great advantage to the quality of the ensilage, but also to the subsequent growth of the pastures.

Under the system of rotational grazing on intensively treated land, the flush months of pasture growth are usually exceptionally vigorous, and if the increased growth is allowed to come to maturity, the feed value will be greatly diminished. The fact that a moderate allowance of ensilage per day will keep a full grown sheep in good condition during winter, makes it more valuable for a minimum of cost. Sheep may be kept through winter with no interference whatever to dairy cows, and when the growth of grass is practically at its lowest.

The making of ensilage means better pasture management and eliminates the possibility of being short of fodder in winter. It also creates a control over weeds and grass which formerly had not been used for grazing. Used as the chief supplementary feed, it is rapidly ousting hay and other root crops, as the main standby until the spring grasses are available.

In the discussion which followed, Professor A. J. Perkins, Director of Agriculture, doubted whether the heavy applications of manure recommended by Mr. Cleve for pasture land would prove practicable in the South-East, excepting possibly in those districts in which the rainfall was heaviest, and in which the soil would continue sufficiently moist during the greater part of the year for the continued growth of grass. Rotational grazing was a practice more or less adopted by all graziers who subdivided their properties. Whilst he had always been a strong advocate of adequate subdivision of pastures, he felt that the question of costs placed a limit on the extent to which the South-Eastern farmer could go in this particular direction; he could not imagine that five-acre paddocks would become at all common on the average South-Eastern farms.

In recommending heavy dressings of fertilisers, Mr. Cleve had made no reference as to whether nitrogenous fertilisers were included among them. At all events, a practice of top-dressing pastures with nitrogenous fertilisers, coupled with rotational grazing, had been recommended by other interested parties. In so far as he, Professor Perkins, could see, the success of the use of these costly manures, coupled with rotational grazing, would depend very largely on the extent to which the growing period of the grass extended, and unfortunately this extension of the growing period was dependent upon the rainfall more than upon fertilisers. The South-East, quite as much as the rest of South Australia, was exposed to frequent summer droughts when the grass could not be stopped from running up to seed, and when consequently rotational grazing would come to an end comparatively early in the year. The present practice of heavy phosphatic dressings had the reverse effect inasmuch as phosphatic dressings tended to hasten the maturity of the plant and consequently to shorten the grazing period, and unfortunately experience has shown that the South-East, like the rest of the State, requires phosphates, and these tend in some measure to undo the work of nitrogenous top dressings. Hence, he believed that it would be only in those portions of the South-East where the rainfall was most regularly distributed throughout the growing period, that rotational grazing on the lines recommended by Mr. Cleve could be achieved with any degree of success.

The Director did not agree with the statement of the writer of the paper to the effect that the best quality ensilage would be made from crops in the leafy stage, which had not yet put forward their flowering stalks. In his opinion both maximum yields and optimum quality in ensilage would be secured from grasses cut just as they reached the flowering period of growth. He supported the desirability of harrowing pastures and "spelling" paddocks from time to time.

THE MARKETING SYSTEM.

[By W. LASLETT, Allandale East.]

Under our present system of distribution there is always a danger of over-production. Supply and demand, we are told, control the market in regard to wheat and wool, both of which find an outlet in the markets of the world, and in this paper I intend to deal chiefly with products that are mainly dependent on a home market, products that by closer co-operation between consumer and producer could, I feel sure, be distributed on a much better principle with benefit to both parties.

Potatoes.—The middleman, or distributor, plays a much bigger part than supply and demand with some lines. Let me deal first with potatoes. South Australia at the present rate of consumption—which, I believe, could be doubled—imports on an average two-thirds of her requirements. Therefore, there should be no fear of our production within the State, but the prices charged by the middleman or the vendor control the demand, for two-thirds of the consumers purchase potatoes by the pound. As a means of comparison, I will give the difference in our district last season of the price the producer received and the price the consumer paid. Bag lots were being delivered at 7s. per bag; the middleman was selling out at 10lbs. for a shilling, or 15s. per bag, thus netting 8s., while the farmer, who has to pay taxes, does all the labor, find bags, etc., only received 7s. That is a true comparison in a district where potatoes are grown, so assuming that only the same difference applies where potatoes are not grown, and that my estimate that two-thirds of the population buy their potatoes by the pound is correct, by basing my calculations on an average family of six, consuming 700lbs. of potatoes per year, I find that the consumers in South Australia lost annually something like £100,000—all paid to the middleman, with no gain to the producer whatever.

Fruit.—Much the same applies to the marketing of fruit, the middleman taking by far the greater share of the profit. Apples, perhaps, more so than potatoes are bought by the pound. I do not know what the producer could have got, but I know that apples sold at 4s. a case were retailed again at 2½d. per lb., a further loss to the consumer of 4s. per case. Such prices limit the demand; whereas a family of six could consume, we will say, 30 cases per year, they would, under the present system, hardly use a third of that amount. This means that two-thirds of the crop have to find a market outside the State, and, in many instances, the grower finds it a better paying proposition to let the apples fall off the trees and rot, than risk the small returns from a glutted market. Dried fruits are the same; the consumer buys a few pounds at a time, the grower loses, growls, and complains about the system, but does scarcely anything to alter it. The producer does not fix the price of the commodity, nor does he advertise the fact that he has it for sale. That part of the business is left to the agent or middleman. Prices are not fixed; the agent gives what he thinks, the consumer gives what he is asked or goes without—which is often the case. Surely there is need for closer co-operation between producer and consumer.

The Distribution of Produce.—It seems to me that the consumer needs educating in the way of buying and should purchase in bulk wherever possible direct from the producer—potatoes by the ton or bag, fruit, both fresh and dried, including currants and raisins, by the case; honey in 60lb. tins, and so on. But the grower does not advertise, and the consumer does not know where to send, or what the freight will be, and it is here that Branches of the Bureau can help one another through the medium of the *Journal of Agriculture*. We are all consumers and most of us are producers. Why not advertise what we have to sell or what we wish to buy, at our meetings. A Branch could consult its members as to their requirements in the lines mentioned. Most of us know our requirements for six months or so, and it should be possible by these means to place a fairly large order and lessen freight charges. As we read the reports of meetings we would read also the price of commodities for sale in ton, bag, or case lots

in certain centres. I would also suggest that the *Journal* publish a list of the freight charges on different articles per 100 miles by rail. We could then figure the matter out and know nearly what the cost would be. Working along lines similar to those I have set out, we would be helping one another, helping the railways, and assisting the State.

STANDARDISATION OF PRIMARY PRODUCTION.

[By B. H. RICHARDSON, Penola.]

Australia is essentially a primary producing nation, and if she is to maintain her present position, and capture fresh markets, she must pay greater attention to the standardisation of her primary products. With lower world's prices we are up against severe competition, and one of our serious drawbacks is our great distance from the markets of the old world, costly freights eating up our profits. For instance, America can land two cases of apples in Europe at the cost of one from Australia. To my mind, we have been depending too much on the markets of the Old World, and neglecting the teeming millions so close at hand.

With regard to poultry, standardisation starts with the breed. I am a great believer in the purebred. Good prices are paid for guaranteed infertile eggs, as compared with the farmer's lots. As England imports some £23,000,000 worth of eggs every year, there is thus an unlimited market for our egg production. A portion of our present wheat surplus could be disposed of in the form of eggs. The export of dressed poultry is a line which has not received the attention it deserves. The Government Produce Export Department has every facility for treating and grading heavyweight birds, and, like egg production, there is a big market in the Motherland.

Pigs.—Pig-breeding will not pay unless everything consumed is produced on the farm. Pig production goes hand in hand with dairying. Bacon-curers are demanding standardisation, and the Tamworth-Berkshire cross seems to be an ideal pig. Too many kinds of pigs are bred, and the breeds should be narrowed down. There is, as far as I am aware, not much data as to the ideal breed, or first cross, for export purposes. In the production of bacon, greater attention should be paid to the growing of lucerne. United States of America breeders practically grow their hogs on alfalfa, topped up with corn.

Cows.—The Roseworthy Agricultural College has a particularly fine Jersey herd, and coming closer home, our Kybybolite Experimental Farm has bred a first class herd of Ayrshires. These cows are all tested, and if the average farmer's cow produced anything like the butter test of the above farms, South Australia would not need to import thousands of pounds' worth of butter every year. Here is a splendid field for exploitation. Standardisation should start with the cow on the farm, and the factories in conjunction with skilled Government Dairy Experts will do the rest. To build up a good dairy herd will take years. Like sheep-breeding, much culling must be done, before all the boarders are weeded out. The cows in this district have improved, but they have a long way to go yet. Here and there you see a very nice herd, but mostly all colors, shapes, and sizes. As far as the dairying industry is concerned, we have Dairy Experts and Instructors, but unfortunately much of their sound advice falls on barren ground. The South-East should be the home of the dairy industry in South Australia.

Sheep.—The revenue derived from this source alone has decreased by some 15 million pounds. Australia has improved her Merino flocks out of all knowledge, and judging by the local yardings, our South-East breeders are producing a fine type of sheep, carrying considerably more wool than some years back. Every breeder has a certain knowledge of wool-classing, and our wool salesmen class and lot our wool, so it may be said that in wool products standardisation has reached a high level. The South-East this year

has put up a record for the number of fat stock sent to the Adelaide markets. With the great improvement in our pastures, due to fertilising, &c., there are big possibilities in the export of fat lambs. Here standardisation comes in again in arriving at the best blackfaced crossbred lamb that can be raised in three or four months on its mother fit for export. We can with improved pastures produce nuggety lambs, and the Government Export Department will do the rest.

Fruit Industry.—With fruit, standardisation plays a big part, not only in the varieties of trees to grow, and the got-up of the fruit, &c. South Australia exported some 600,000 cases of apples to the markets of the Old World last year. Grading for size and quality is a big factor in apple production. Apples for export are now sized into eighths. For example, 2½in., 2¾in., &c., up to 3in. This is necessary for perfect packing in the new standard case. If correctly packed, for instance, every case of 2¾in. apples should contain the same number of fruit. Under the standard pack and standardisation of varieties of apples, our export trade should reach a high level. Our dried fruits are all graded by machinery, and are known as 2, 3, 4 Crown according to the sizing of the fruits, i.e., they pass through holes having certain diameters. At one time there was a big demand for dried prunes, large and small, but the trade is demanding standardisation, and a larger sized prune, going 22, 24, &c., to the pound is required.

CLOVER HAY MAKING.

[By E. C. H. SCHINCKEL, Kybybolite.]

With the advent of Subterranean clover and top-dressing, a big forward step has been made in the South-East in the development of pastures. So excessive has been the growth that to many of us it has caused considerable thought as to how it may be utilised and a great waste of valuable fodder avoided. There is no fodder plant known to the writer which provides such an abundance of highly nutritious fodder all the year round as well-cared-for Subterranean Clover, but, like all other fodder plants, it has its lean period, which in the case of this plant occurs in the late autumn and early winter, just after the rains commence.

In average seasons—from early spring to the time when the autumn and winter rains come—well established clover paddocks liberally fertilised will carry three to four sheep to the acre, and in some cases more, but after the first rains which spoil most of the dry feed, there occurs a lean period while the young plants are establishing themselves. As with all our pastures in the South-East, excess growth occurs in the spring, when usually the stock available are quite inadequate to utilise all the feed. The wise man stacks to the leanest period, but if a full complement of stock is to be carried all the year round, and the best results obtained from our pastures, supplementary feeding has to be resorted to during that lean period. With such a growth of feed during the late spring, a wonderful opportunity presents itself for storing up a quantity of highly nutritious fodder at a relatively low cost.

During the last three years the writer has been storing annually 100 to 150 tons of clover hay, by various methods. Results have been so pleasing that every hour during the limited period in which these operations can be conducted is availed of for clover hay making. Feeding results from this hay have been so pleasing that on the writer's property it has definitely taken the place of cereal hay. All classes of farm stock show a decided preference for it over any of the cereals, and it has the advantage of being produced much more cheaply. It is of higher feeding value, and can be stored indefinitely without interference from mice.

Last winter will be remembered by stockowners in the South-East as a very lean one—so far as feed was concerned—and where full complements of stock were being carried, hand-feeding had to be resorted to if stock were to be kept in good condition. With a relatively large proportion of lambing ewes in his flock, which necessitated preserving good pasture paddocks for these, the writer was compelled to resort to hand-feeding fairly extensively, and big mobs had to be concentrated in small paddocks in some cases. In one case, 700 weaners were shut in a 40-acre paddock for 12 weeks, and were fed entirely with clover hay. The writer considered this a good test for the feeding value of this hay, and the results were only to increase his enthusiasm for this fodder.

Excellent results were also obtained from topping off wethers for the Adelaide market during the winter months. Though these sheep were grazing on an abundance of luscious feed, they would always race to the motor truck that took out their daily rations of hay. It was very obvious also that sheep hardened off with this feed did not show the ill-effects of the long journey to Adelaide as sheep trucked straight from the green pasture without it. It is excellent for feeding dairy cattle, quite equal to cereal hay for working horses, and even pigs seem to relish it.

There are various implements used in the making of this hay, and the equipment necessary depends on the quantity to be handled. For small quantities the mower and horsrake are the only essential implements, the stacking being done with forks. This method is slow and tedious, and where large quantities are to be handled the sweeprake and mechanical stacker or the sweeprake and baler are advocated. As the above three methods have been employed on the writer's farm, the respective merits of each will be dealt with in the order mentioned.

As before said, with the use of the mower and ordinary horsrake to put the clover into windrows, only a limited amount can be handled unless a great deal of labor is employed; though, of course, the outlay in machinery is small. Where large quantities,



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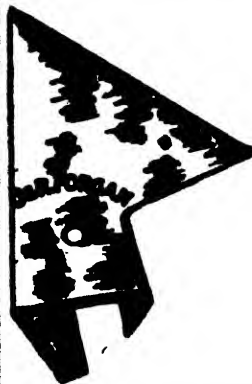
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say 50 tons or more, are to be hauled, the cost of the sweeprake and stacker will soon be repaid by the saving in labor.

Mechanical stacking is the quickest and cheapest method of the three. A boy can manage the sweeprake, which picks up its load from the mower swath and deposits it on the stacker. It is then hoisted by a horse straight on to the stack, where one man is required for the building. By this method a boy and a man can stack 10 to 12 tons a day.

From the writer's experience, however, the baling process—though it involves a good deal more capital cost in machinery—has decided advantages over stacking loose. Chiefly they are these: That the hay is contained in about one-third the space required for the same quantity stacked loose, necessitating a smaller outlay in covering from weather; it is much more convenient for feeding out to stock, and is ready for market should there be any surplus for sale. The only advantage the loose stacking method has over the baling is that it is a little cheaper, but this saving is soon lost when feeding out to stock, as it involves a great deal more labor than feeding out the baled hay. At one period last winter 2,000 sheep were being hand-fed on the writer's property. These were fed in five different paddocks, and two men with a motor truck used to complete the job in an hour. If loose hay had been used, necessitating knifing out of the stack, this work would have taken two men half a day. Another disadvantage in the loose hay method is that in the event of marketing it would have to be handled again for baling. The writer is also of the opinion that the valuable feeding qualities and natural aroma are better preserved in the baled hay.

The baling process requires two men and two boys. The sweeprake picks up the hay from the mower swath and deposits it alongside the bale, where one man forks it straight into the machine. One man is required for the wiring and tying, and another lad to assist with the wiring and to stack the bales. From 10 to 12 tons can be baled in a day.

Mowing may be commenced as soon as the clover has reached its maximum growth, which usually occurs in the earlier South-Eastern districts about the end of October or early November. Heavy types of mowers are necessary to stand up to the strain in a heavy crop. The writer advocates the use of a cut of not more than 4ft., which is a very good load for two horses. Knives should be sharpened twice a day, and the machine kept in a rigid condition.

Paddocks intended for cutting may be grazed up to the middle of September or even later in the lower South-Eastern districts, and will then produce 30cwt. to 2 tons per acre of hay; provided, of course, that it has been well fertilised. Care and judgment are required in the baling and stacking of this hay. The ideal condition is to get it into bales or stack without losing the leaf of the clover, but to have it sufficiently dry or cured to prevent mould, great care must be exercised in avoiding baling or stacking when there is any external moisture such as dew or rain on the hay. This will cause mould, and if in excess, may cause combustion. Only experience can teach one his part of the business, but by close observance one can soon tell when the hay is in a nice condition for handling.

With favorable weather for curing, the hay is usually ready for stacking or baling in four to five days after cutting, though the weight of crop influences this very considerably. In a very heavy crop, where the hay lies thick in the swath, the upper portion dries out much more quickly than the lower, which sometimes takes eight to ten days to dry. To get a perfectly even curing, a tedder or swath turner is necessary, but these implements are not procurable in Australia at present. Apart from the conservation of this valuable fodder, the mowing of these paddocks has proved very effective in suppressing relatively useless weeds when cut at the right time, keeping the pasture in a fresher condition and thus preventing deterioration.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF SOUTH-EASTERN BRANCHES.

Branches of the Agricultural Bureau situated in the South-Eastern districts of the State met in Conference at Kalangadoo on March 18th. There was an excellent attendance of delegates from the Penola, Coonawarra, Allandale East, Tantanoola, Kalangadoo, Millicent, Mount Gambier, Naracoorte, Glencoe, Tatiara, and Kybybolite Branches.

The Department of Agriculture was represented by Mr. S. Shepherd (Advisory Board of Agriculture), Professor Arthur J. Perkins (Director of Agriculture), Messrs. H. B. Barlow (Chief Dairy Instructor), L. J. Cook (Manager Kybybolite Experimental Farm), E. S. Alcock, H. H. Orchard and W. H. Downes (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

Members of the Kalangadoo and surrounding Branches are to be congratulated on the very fine exhibit of produce displayed in the hall. This included dried, fresh, and preserved fruit, cereals, vegetables, tobacco plants, green fodders, and specimens of needlework tabled by members of the Kalangadoo Women's Branch.

Mr. W. J. Hemmings, President of the Local Branch, occupied the chair, and the opening address was delivered by Mr. S. Shepherd. The following papers were read and discussed:—"Ensilage and Grass Land Management," Mr. R. Cleve (Mount Gambier); "The Marketing System," Mr. W. Laslett (Allandale East); "Standardization of Primary Products," Mr. H. Richardson (Penola); "Clover Hay Making," Mr. E. Schinckel (Kybybolite). Numerous questions were answered by Departmental officers, and the following resolutions were carried:—"That the 1932 Conference be held at Bordertown"; "That it be a recommendation from this Conference that washed super bags be allowed for use as containers for potatoes and grain other than wheat"; "That in future evening sessions at Conferences be cut out, and that Free Parliament be brought on earlier after luncheon."

Certificates conferring Life Membership of the Agricultural Bureau were presented by Mr. S. Shepherd to Messrs. W. Hemming and W. J. Bennett, sen., of the Kalangadoo Branch.

After luncheon, which was provided by the members of the local Women's Branch, a special session was held for women. Mrs. W. Varcoe (Millicent) read an instructive paper, "Breadmaking."

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CONFERENCE OF MID-NORTH BRANCHES.

The thirty-fifth Conference of Mid-north Branches of the Agricultural Bureau was held at Wirrabara on March 11th, 1931. There were present Messrs. A. M. Dawkins (member Advisory Board of Agriculture), Prof. A. J. Perkins (Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), A. H. Robin, B.V.Sc. (Government Veterinary Officer), C. F. Anderson (Poultry Expert), E. L. Orchard, J. B. Harris, J. O. Hatter (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau), and a very good attendance of delegates from the following Branches:—Tarcowie, Wirrabara, Booleroo Centre, Laura, Yandiah, Appila, Georgetown, Caltowie, Jamestown, Eurelia, Murraytown, Morehard, Bundaleer Springs, Nelshaby, and Gladstone.

Mr. P. J. Curnow (Wirrabara) read an instructive paper, "Practical Fire Fighting," and officers of the department replied to many questions which were brought forward. It was decided to hold the 1932 Conference at Caltowie. Addresses on the subjects, "Feeding Dairy Cows" and "Poultry as a Farm Sideline," were delivered by Messrs. H. B. Barlow and C. F. Anderson. Mr. Dawkins presented trophies to the successful competitors in the Northern Crop Competition:—First, W. F. Wurst (87 points), barometer; second, C. Kleinig (86 points), £1; third, V. Walter (85 points), 10s. A



Delegates at Conference of Mid-Northern Branches held at Wirrabara on March 11th, 1931.

special trophy—entree dish, presented by the manager (Mr. Riley) of the National Insurance Company to members of Caltowie Branch—was won by Messrs. Neindorf Bros. The following resolutions were carried:—"That the Government be asked to extend the time of rail concession on super to June 1st." "That an endeavor be made to have better supervision of the quality and standard of cornsacks offered for sale by firms and issued to farmers."

There was an excellent representation of delegates from Women's Branches in the Conference district. Mrs. E. L. Orchard (Belalie) presided, and interesting papers were read. These were as follows:—"Poultry on the Farm" (Mrs. R. Noble, Nelshaby), "Art Needlework" (Miss R. Haines, Nelshaby), "Wet Frying" (Miss W. Stott, Eurelia), "How to Run a Kitchen" (Mrs. G. Smallacombe, Gladstone), "Homemade Bread and Yeast Cakes" (Mrs. F. Cumming, Belalie). Addresses were given by Messrs. Barlow and Anderson.

A paper and demonstration on the subject "The Uses of Hessian in the Home" was given by Miss E. Campbell, Dip. Dom. Econ. (Education Department).

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1931.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow December to February.	Per Herd during February.	Per Cow during February.	Per Cow December to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ...	20	13-64	3,352	167-60	981-73	159-77	7-99	43-33	4-77
6/C ...	18	14-46	4,543	252-39	1,198-89	201-23	11-18	50-97	4-43
6/F ...	24	17-50	6,647	276-96	1,581-30	314-42	13-10	69-11	4-73
6/H ...	20	19	6,566	328-30	1,336-25	305-35	15-27	59-16	4-65
6/O ...	19	16-86	7,477	393-53	1,577-71	384-46	20-23	76-51	3-80
6/R ...	19-96	9-29	2,225	111-47	542-47	124-29	6-23	32-46	5-59
6/U ...	19	16-43	5,746	302-42	1,165-19	238-65	12-56	46-40	4-15
6/W ...	23-14	19-21	10,950	473-20	1,569-96	486-08	21-01	72-04	4-44
6/Y ...	15	10	4,648	309-87	1,357-21	222-80	14-85	56-81	4-79
6/E ...	49-04	39-43	21,834	445-23	1,505-80	947-31	19-32	64-15	4-34
6/I ...	34	30-64	18,560	545-88	1,992-69	823-40	24-22	86-12	4-44
6/K ...	27	20-29	14,509	537-39	1,750-10	637-26	23-60	75-79	4-39
6/L ...	22	20-29	13,466	612-09	1,970-69	577-45	26-25	84-65	4-29
6/MM ...	15-60	13-86	5,327	348-67	1,134-01	241-67	15-59	54-36	4-54
6/0 ...	19-39	15-25	12,044	621-14	1,827-94	527-77	27-22	82-01	4-38
6/P ...	20	20	13,090	654-60	1,953-26	639-51	31-08	91-38	4-89
6/Q ...	27	24-64	17,706	655-80	2,282-87	751-42	27-83	96-07	4-24
6/R ...	23-57	24-60	18,967	663-87	2,207-89	687-75	31-07	96-08	4-68
6/S ...	20	25-18	18,911	727-35	2,740-22	782-25	30-09	110-84	4-14
6/T ...	22-68	18-25	10,112	445-85	1,468-09	464-81	20-49	65-75	4-60
6/U ...	40-79	38-82	18,046	442-41	1,572-98	803-05	19-69	67-41	4-45
6/V ...	20	18-75	13,346	667-30	1,523-68	631-66	31-58	71-51	4-73
Means .	24-09	20-29	11,276-05	468-00	1,658-19	506-93	21-74	72-77	4-50

Metropolitan Abattoirs, Adelaide.

MANUFACTURERS OF

Meat Meal for Pigs.

Read Report of trials made by PROF. PERKINS, *Journal of Agriculture*,
January and July, 1921.

Meat Meal for Poultry.

For full information on above write to

The GENERAL MANAGER, Metropolitan Abattoirs Board, Box 573E,
G.P.O., Adelaide.

ALSO MANUFACTURED—

Blood Manure

Bone Manure

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1931.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow July to February.	Per Herd during February.	Per Cow during February.	Per Cow July to February.	
7/D ...	26	20-79	Lbs. 12,895½	Lbs. 495-98	Lbs. 5,191-59	Lbs. 580-68	Lbs. 20-41	Lbs. 218-42	% 4-12
7/E ...	26-61	25-61	13,061½	490-85	5,568-60	560-32	21-06	231-60	4-29
7/H ...	8	7	3,514	430-25	5,561-23	182-84	22-85	248-70	5-20
7/J ...	17-89	15-57	8,951½	500-36	4,839-24	418-49	23-39	227-41	4-67
7/K ...	18	16	10,164	564-61	6,153-44	438-66	24-39	265-20	4-82
7/L ...	35	33	14,588	416-80	4,114-87	672-51	19-21	193-23	4-61
7/O ...	21	17-75	6,688½	318-50	3,578-25	308-39	14-59	170-69	4-58
7/S ...	14	4-50	1,673	119-50	4,818-50	90-26	6-45	255-73	5-40
7/T ...	11	8-86	3,890½	353-68	4,383-23	169-48	15-41	184-35	4-36
7/V ...	9	8	5,166	574-00	3,503-94	260-63	28-66	166-98	5-05
7/W ...	21	17-93	9,050	430-84	5,284-26	417-31	19-88	238-89	4-63
7/X ...	15-39	13-57	5,196	337-62	5,437-40	227-14	14-76	230-29	4-37
7/Y ...	21	16-11	9,091	432-90	3,887-92	415-30	19-78	184-84	4-57
7/Z ...	11	7-64	6,612½	601-13	3,419-95	294-34	26-70	153-01	4-45
7/AA ...	8	6-61	2,910½	363-81	3,778-50	147-31	18-41	190-32	5-06
7/BB ...	16	12-53	8,404	568-27	4,806-80	362-29	24-15	198-88	5-08
7/DD ...	12	9	4,676	389-66	5,035-09	237-03	19-80	248-63	5-08
7/EE ...	27	21-86	6,678½	247-35	3,492-75	306-60	7-36	144-84	4-59
7/GG ...	14	14	5,446	389-00	3,814-88	280-83	20-06	195-15	5-16
7/HH ...	17	14-32	6,324½	372-03	4,161-34	288-22	16-95	181-87	4-56
7/II ...	13	11-18	4,193	322-64	3,820-76	212-57	16-35	181-88	5-07
**7/JJ.	19	19	12,327	648-73	1,378-86	539-59	23-40	59-92	4-38
Means .	17-27	14-58	7,340-98	425-15	4,643-07	334-53	19-37	209-45	4-56

* Commenced August.

** Commenced January.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1931.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.	
5/C....	29-07	24-93	Lbs. 11,496	Lbs. 395-46	Lbs. 2,627-51	Lbs. 606-35	Lbs. 20-86	Lbs. 127-32	% 5-27
5/D....	29	23-54	8,539½	294-47	2,392-60	465-95	16-00	126-76	5-43
5/E....	35	30-04	12,936½	369-61	2,415-58	670-05	19-14	124-17	5-18
5/J....	23-93	14-82	3,754	156-87	1,880-33	200-77	8-39	101-85	5-35
5/O....	22-14	19-04	7,440	336-04	3,062-63	441-62	19-95	162-57	5-94
5/R....	54-43	42-79	11,180	205-40	1,921-26	471-44	8-66	81-65	4-22
5/S....	30	14-82	4,915½	168-85	2,060-84	251-00	8-87	102-74	5-11
5/T....	20	15-54	7,651½	382-58	2,810-51	363-34	18-17	125-52	4-75
5/U....	20	15-54	10,514	525-70	3,384-21	451-14	22-56	146-50	4-29
5/Y....	26	24-03	14,924	574-00	3,229-95	775-55	29-83	166-92	5-20
5/Z....	29	11-75	7,512½	259-05	3,542-52	877-20	13-01	168-53	5-02
5/AA....	18	16-93	8,908	494-89	2,257-19	440-24	24-46	112-94	4-94
5/CC....	33-86	13-64	3,017	89-10	1,613-85	143-39	4-24	71-67	4-75
5/DD....	21-60	17-93	8,765	407-67	2,610-52	455-08	21-17	134-31	5-19
5/EE....	15	15	7,840	593-49	3,259-27	391-68	29-59	156-25	5-00
5/II....	27-18	22-46	10,276½	378-09	3,348-84	508-94	18-72	157-07	4-95
5/JJ....	27	15-75	8,399½	311-10	2,836-26	389-06	14-41	131-96	4-64
5/KK....	22-04	18-75	11,666	529-31	2,574-25	545-71	24-76	117-00	4-68
5/MM....	14	18-25	7,707	550-50	2,860-86	412-15	20-44	147-75	5-35
5/NN....	29	26-18	12,809	424-45	2,931-59	547-11	18-87	128-68	4-44
5/OO....	23	18-54	10,654½	463-24	2,585-33	468-31	20-36	130-13	4-40
Means .	26-15	19-77	9,066-95	346-73	2,621-72	446-39	17-07	125-66	4-92

"LUCERNE-GROWING IN SOUTH AUSTRALIA."

[By W. J. STAFFORD, Deputy Director of Agriculture.]

INTRODUCTION.

The great bulk of the farmed part of South Australia is situated in climatic conditions usually described as being semi-arid, the remainder having a mild temperate climate, and although no difficulty is experienced in growing a considerable assortment of agricultural crops where sufficient rain is received, this does not apply to much of the State. The cereals, Wheat, Barley, and Oats, can be profitably grown in all districts possessing natural conditions good enough to support farmers, but to date we have discovered few other plants that can be economically produced in much of our country, except where sufficient water exists to enable crops to be grown under irrigation. A notable exception to this is one of the most



LUCERNE CROP.—Showing luxuriance of growth and heavy yield of forage produced in suitable conditions. Illustration of crop grown with irrigation on reclaimed swamp land of the River Murray.

important agricultural crops known to man, namely, Lucerne, which flourishes in semi-arid climates, and although requiring a good deal of water to reach its maximum production, nevertheless grows well wherever the cereals can be profitably produced in these climatic conditions.

Besides being one of the hardiest of the known agricultural crops for hot, dry conditions, Lucerne is one of the most palatable and nutritious foods for livestock, and all of the farm animals and birds maintain themselves and thrive on it. The crop has been cultivated for centuries in the semi-arid portions of Asia, as well as in parts of Europe, and in all places it produces an abundance of fodder of the highest quality, improves poor soils, and eradicates weeds.

It can be successfully grown in all types of soil, from loose open sands to heavy clay loams, and thrives in the limey soils which are so prevalent with us, and judged by the experience of the World with the crop, Lucerne will eventually play an increasingly important part in our agriculture, enabling farmers to practise the essential combination of cereals and live-stock.

HISTORY.

Lucerne is one of the very old agricultural plants, having been domesticated for thousands of years, and in man's rise in civilisation it has played an important part, and has been established by man in almost all parts of the earth. It spread from central Asia into Greece and Italy, then throughout the Mediterranean region and into northern Europe. The Spaniards took it to South America, from where it spread into North America, and the crop has done so well in the Americas, and so much publicity has been given to it by the United States that there are at present very few places in the World where it is not known.

In Europe the plant was called Lucerne, under which name it is still known in Australia, but the Americans use the Spanish name of Alfalfa, which was derived from the Arabic name meaning "the best kind of fodder."

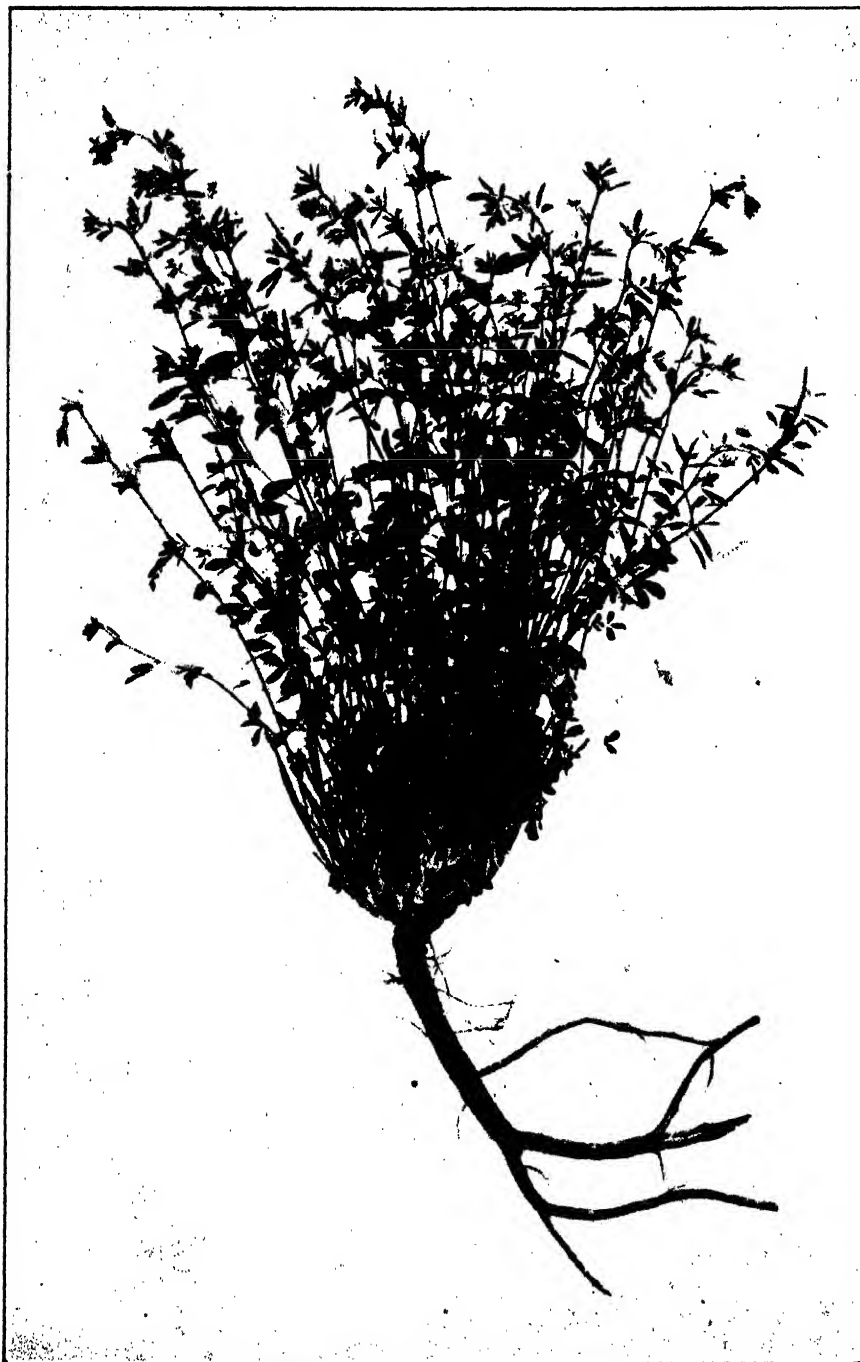
Lucerne was introduced into Australia shortly after the first settlement by white man, and as early as 1806 the crop was referred to in a report by Governor King, wherein he said:—"Lucerne yields as many as three cuttings a year, but as it will not admit of being fed off few cultivate it." At first the progress made by the crop was rather slow, but there has been a progressive advancement in the area seeded with Lucerne, and in recent years this has been really rapid, and it appears inevitable, as the value of this wonderful fodder plant as an unirrigated crop for our ordinary wheat lands is realised, that it will become increasingly popular in this country.

DESCRIPTION OF THE LUCERNE PLANT.

Lucerne (*Medicago sativa*) is a perennial leguminous plant, being either more or less covered with soft hairs or almost smooth, which grows from 1ft. to 3ft. in height, producing fairly upright stems with many branches and much foliage. The stems all originate from a crown at the summit of the tap-root, which is situated above or at the surface of the ground. The leaves, which are arranged alternately on the stems, consist of three leaflets, are in all kinds wedge-shaped, but vary considerably, in some being relatively long and narrow, whilst in other varieties they are short and rounded. All leaflets are toothed at the summit. The flowers, which in different varieties may be any shade of violet from very pale to a deep reddish-purple, are typically pea-like in shape, though much smaller, and are arranged in loose clusters at the summit of each branch. There are two to six kidney-shaped seeds of a yellowish-green color in each pod, and they are about one-eighth of an inch in length: the pods being spirally twisted in two to four loose coils, open through the centre.

Swedish Clover (*Medicago falcata*), sometimes known as Yellow Lucerne, is a perennial plant with some resemblances to Lucerne, but is a shorter-growing plant with underground stems, bright yellow flowers, and sickle-shaped pods.

Another plant belonging to the genus *Medicago*, of interest is the so-called Sand Lucerne (*Medicago media*). This plant is considered to be a hybrid between *Medicago sativa* and *Medicago falcata*, and in habit of



AUSTRALIAN LUCERNE.—Typical plant of Australian Lucerne, showing erect growth, strong stems, freedom from excessive branching, and vigorous root system.

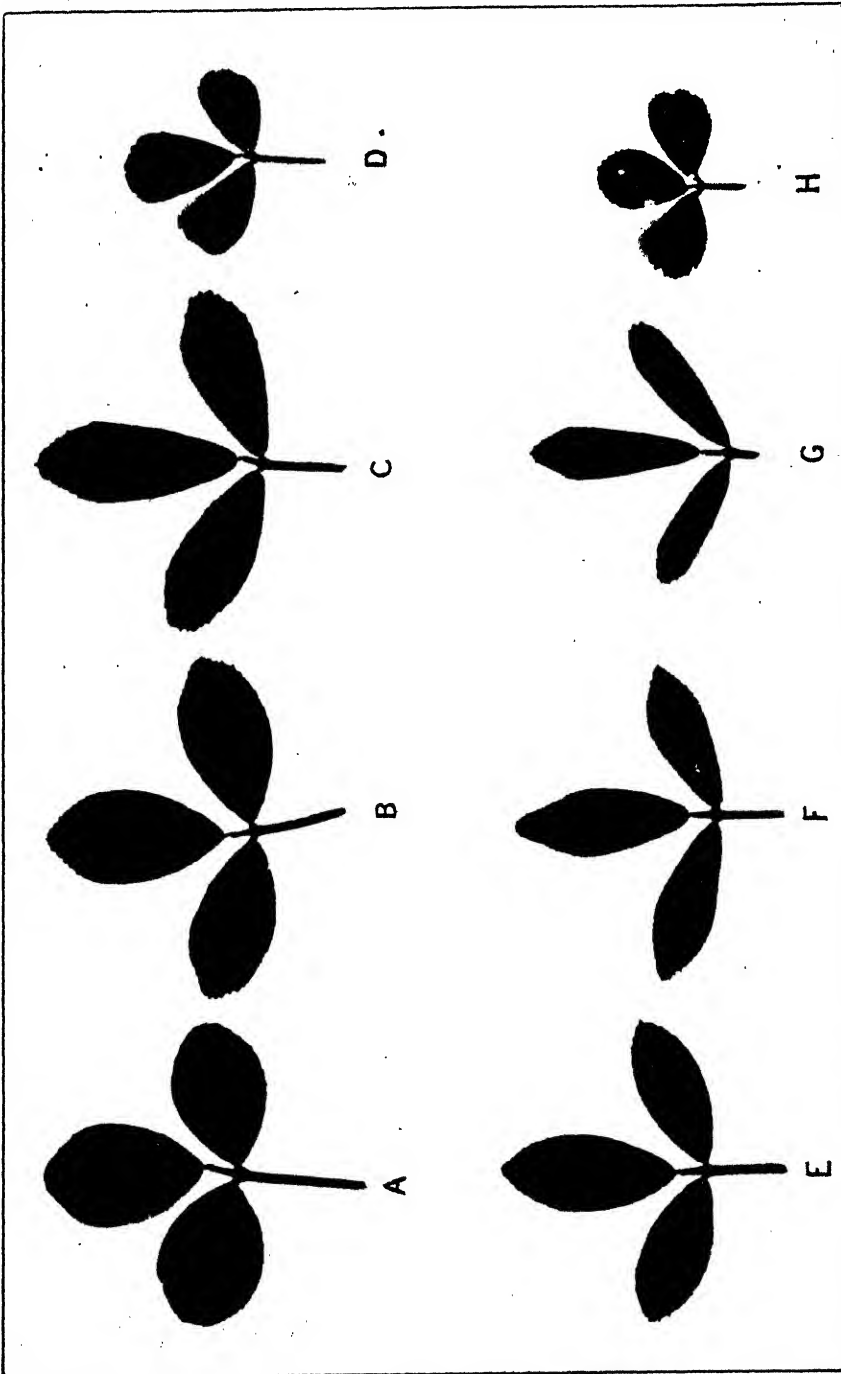
growth is more or less midway between the two, and produces flowers which may be snow-white, bright yellow, or any shade between these and deep purple. The crowns from which the stems spring are all located well below the surface of the ground, and many of the plants produce true root-stocks, and so do not suffer from extremes of cold, and are proper perennials. Considering that seedlings do not throw true to any type, it appears incorrect to call it a distinct species. Some of the varieties of Lucerne grown in cold climates, such as Grimm, Ontario Variegated, Cossack, Baltic, etc., appear to be selections from one or other of these hybrid Lucernes.



AUSTRALIAN LUCERNE.—Showing flower-heads opening and in full bloom, and seed-heads with some of the pods just coloring.

VARIETIES OF LUCERNE.

Although Lucerne is grown so extensively in the World, it is one of the few cultivated plants which have not been separated into a very great number of varieties with distinct names. The tendency has been rather towards specialising in a certain type of Lucerne for large tracts of country where natural conditions are somewhat alike, and then giving this type the name of the locality. For instance, the principal types are known by the name of the country of origin, as for instance:—American Type, Peruvian Type, Arabian Type, Turkestan Type, German Type, Australian Type, and so on, and these regional types are again subdivided into different types, such as the American Type being split up into Kansas-grown Alfalfa, Oklahoma-grown, Texas-grown, Nebraska-grown, &c.



LUCERNE LEAVES.—A, B, C, E, F, & G, showing variations in shape of the leaflets found in a crop of Australian Lucerne, typical in other respects. D & H show leaves of Variegated Lucerne.

In countries sufficiently extensive to include temperate and tropical climatic conditions, Lucernes are classified into types suitable for different climates, the principal classes being what are known as the "*hardy*" group, including those kinds able to withstand cold winters without suffering winter injury, and the "*non-hardy*" group, which consists of the varieties suited to the hot, dry conditions of semi-arid country, and to sub-tropical regions.

In all portions of Australia where Lucerne is extensively grown the winter climate is really mild, and as a consequence we only grow the so-called "*non-hardy*" type of Lucerne. As a matter of fact, although we place different locality names on the seed produced in the country, practically all of the Lucerne stands established in recent years consist of what has become known as the Hunter River Type of Lucerne. There are, however, several types of Lucerne advertised in the country from time to time, and so brief statements on some of them are given.

LUCERNE VARIETIES SUITED TO DISTRICTS WITH MILD WINTERS.

All varieties of Lucerne found to be suitable for semi-arid and sub-tropical conditions of climate are essentially pure *Medicago sativa*, and are not derived from strains of hybrid origin, as are many other varieties grown in colder climates. In countries where extremely cold winters are experienced they are looked upon as being "*non-hardy*," because they suffer very badly or are killed during the winter; but where mild winters are the rule they do well, starting to make growth much sooner in the spring, recover after cutting much quicker, and continue growing longer into the autumn than do the so-called "*hardy*" types of Lucerne.

They are all characterised by carrying flowers of a violet color, although in some varieties they are of a darker shade than in others. The crowns from which the stems develop are situated above or at the surface, and the stems are more or less upright in habit.

PERUVIAN LUCERNE.

The Peruvian type of Lucerne consists of two strains, one of which is almost smooth, whilst the other has so many hairs on all parts of the plants that the crop has a greyish appearance. Other than the difference in hairiness the two behave in a similar manner, and are usually grouped together, although some claim that the hairy strain is much the better of the two. Peruvian Lucerne produces very erect, upright stems which are comparatively coarse, and possess rather few branches. It is generally conceded that this is one of the best of the Lucernes because of this erect habit of growth and its power of commencing growing earlier than other kinds, continuing growing after other varieties have become dormant, recovering rapidly after cutting, and making strong growth during periods of short cool days.

ARABIAN LUCERNE.

With Arabian Lucerne is included Algerian Lucerne, the seed of which is given prominence at times. This type is fairly hairy, but less so than Hairy Peruvian. It is a very erect type, and is characterised by having soft hollow stems, and leaves of a lighter color than most other kinds. There is no other variety which starts growing so early in the spring, continues

so late in the autumn, or recovers so quickly after cutting, but these obvious advantages are more or less counteracted, because this variety only produces a light seed crop, and it is a short-lived kind. In many cases stands of Arabian Lucerne only last four years before becoming too thin to be profitable.

TURKESTAN LUCERNE.

Turkestan type of Lucerne is probably one of the best to withstand the great heat and great cold experienced in some parts of the semi-arid regions of the World. It is not such an erect grower as most other of the "non-hardy" kinds and has rather wiry slender stems, and a low-spreading, branched habit of growth. In good Lucerne-growing conditions it is not nearly so productive as some other kinds, and any popularity it has attained is wholly due to its extreme hardiness in cold, dry localities. This variety has rather narrow leaflets, and the plants are fairly hairy.



LUCERNE CROP.—Showing the stand of typical Australian Lucerne with erect habit of growth, strong stems, and freedom from excessive branching.

GERMAN LUCERNE.

The German type of Lucerne is very similar to the Turkestan in general behaviour, but it is a little better cropper. It is a more succulent plant, with broader leaves, and usually carries less hairs.

COMMON AMERICAN LUCERNE.

The Lucerne known as Common American includes several of the erect, rapid-growing types, but the kinds approaching the Peruvian and Arabian most certainly predominate, and so on the average it is a good deal superior to the Turkestan and German types.

PROVENCE LUCERNE.

Provence Lucerne seed is usually on sale in Australia at a lower price than locally grown seed. This type is very similar to Turkestan and German Lucernes, being a rather low-spreading, much-branched kind with

fairly fine-textured stems. It starts to grow early in the season, and continues late into the autumn. It is a fairly good variety for pasturing purposes, but is not nearly so productive as the more erect types when grown in good conditions or when irrigated, particularly if the crop is cut and carted off the land, or made into hay.

AUSTRALIAN LUCERNE.

The term Australian Lucerne is quite justified for most of the crops grown in this country, because there is very little variation in the behaviour of the types usually grown, at all events in the better lucerne-growing districts, and where irrigation is practised. There are noticeable differences between stands of Australian Lucerne in the shade of violet coloration of the flowers, in the shape of the leaflets, in the length of life of the plants, and in the amount of hairiness present, but most crops conform to what are expected from the so-called Hunter River type, viz., very erect growth of relatively coarse stems without a high proportion of branches, early start in the spring, rapid recovery after cutting, continuance of growth well into the autumn, rather dark violet color of flowers, and ready response to irrigation water applied in the summer.

Australian Lucerne appears to have been derived from Smooth Peruvian and Arabian Lucernes, and perhaps Common American also forms part of it, but whatever its derivation, the type evolved certainly suits the conditions in which it is usually grown, and at present it appears that the only type, not well known in the country, likely to do as well or better, would be Hairy Peruvian. When, however, we reach the stage of endeavoring to grow Lucerne where severely cold winters are experienced, we may get some help from the growing of the so-called "hardy" types which are not liable to winter injury.

LUCERNE VARIETIES ABLE TO WITHSTAND SEVERE WINTERS.

Although not of any importance in South Australia at present, and probably they will never be needed to any great extent in the country, there are some varieties of Lucerne capable of withstanding severe cold, even where the soil periodically freezes at the surface during the extremely cold winters usual in some localities. All of these kinds appear to have been derived from hybrids between *Medicago sativa* (Lucerne) and *Medicago falcata* (Swedish Clover), and are known as Variegated Lucernes, because of the great variety of colors found in the flowers. It is quite usual to find all shades between bright yellow and deep reddish purple, and not a bit uncommon to see snow-white flowers as well. These Variegated Lucernes do not produce nearly as much fodder as do the true Lucernes in good Lucerne-growing conditions, but their great advantage lies in the fact that they have rendered possible the production of heavy yields of high-class leguminous forage in places too cold to support true Lucerne. They have a spreading rather than erect habit of growth, and as the crowns are well below the surface, all the plants tend to produce a large number of stems to each plant. Some of the plants have true rootstocks, and as a consequence they tend to spread and make patches, but even those plants without the underground stems tend to make large clumps as they get older. The Variegated Lucernes are very long-lived, and carefully managed stands will outlast the ordinary kinds. The seed of all varieties of this kind of Lucerne is dearer than seed of ordinary Lucerne, and it is always likely to be so, because they are comparatively light seeders.

Several strains of Variegated Lucerne have been kept separate and distinct, but the two outstanding kinds are Canadian Variegated (also called Ontario Variegated) and Grimm Lucerne, both of which are fairly extensively grown in the northern portions of the United States of America and in Canada. Very similar to these two are Cossack, Baltic, Siberian, etc., but not one of these latter kinds has yielded so well as either of the former two when grown in the same conditions.

These Variegated Lucernes are of interest to us just now because two kinds of Lucerne which are being given some prominence—Tagerim and Western Port—appear to be selections from one or other of them.

CANADIAN VARIEGATED LUCERNE.

Canadian Variegated Lucerne originated in Ontario, and in all probability is a mixture of the two original importations of Variegated Lucerne, one from Baden in Germany and the other from Lorraine in France. The extreme hardiness of this variety appears to be due to the fact that some of the winters experienced in Ontario since it has been grown there have been so very severe that all the tender plants were killed and only the very hardiest remained, and it is from these particularly hardy plants that present-day stands were derived. It is probably the hardiest where cold is concerned, and the longest-lived of all Lucernes.

GRIMM LUCERNE.

Grimm Lucerne is very similar to Canadian Variegated, but is not quite so resistant to severe cold. It was introduced into the United States of America in 1857, and was first grown by Wendelin Grimm, from whom its name was derived.

REQUIREMENTS OF THE LUCERNE CROP.

Lucerne is certainly one of the hardiest of the cultivated crops, particularly for semi-arid climates, where much heat and dryness are common and where long dry spells are sometimes experienced, and in such conditions will produce more growth of high-class forage than will any other known perennial plant. It is not very fastidious as to the type of soil in which it grows, does not require much soil moisture near the surface, except for the germination of the seed, but on the other hand, flourishes in an abundance of sunshine and high summer temperatures. Despite the remarkable hardiness of the plant, there are certain special conditions in which the crop reaches its greatest luxuriance, such as well-drained deep soil fully supplied with lime, plenty of good water for irrigation or an unfailing underground supply only a few feet from the surface, absence of extreme frosts in winter, good seed, proper soil tillage before seeding, thorough cultivation during the life of the crop, and sufficient phosphatic fertiliser.

SOILS SUITABLE FOR LUCERNE.

Lucerne can be grown in all types of soil between light sands and heavy clays, but like most others of the cultivated crops, it does best in rich, deep, well-drained soils. What the crop does demand is good drainage and plenty of lime in the soil, and given these two essentials, it is not very particular as to the type of soil, and will usually grow very well. Although Lucerne uses a lot of water, it cannot tolerate an excess in the soil, and as a matter of fact soils liable to become waterlogged are quite unsuitable

for the crop until they are artificially drained. Its requirements for lime are enormous—probably greater than any other of the ordinary cultivated crops grown in similar conditions, and in some cases, Lucerne may take from the soil up to a dozen or more times as much lime, weight for weight, as some other crops. The plant appears to be unable to develop a proper root system in the absence of sufficient lime, and the leaves take on a yellowish color, and the stand soon thins out.

Although Lucerne grows well in heavy-textured soils, it prefers the more porous soils, because they are naturally well drained, and they enable the roots to penetrate deeply, which suits this deep-feeding plant. The roots of Lucerne plants have been found at great depths, but in normal soils the tap-root of year-old plants may be down 6ft., at the end of the next year 10ft. to 12ft., and ultimately extend 20ft. to 30ft. in depth.

Practically all soils in South Australia are suitable for the production of good crops of Lucerne, the only exceptions being the rather sour soils resting on a heavy clay, to be found in a portion of the Adelaide Hills district, and a small area in the South-East district, where buckshot-iron-stone soils overlie an impervious clay. Most other soils in the State are well supplied with lime, and have suitable texture for Lucerne-growing, but depending on the type of the soil and availability of water so will the preparation and after-treatment vary.

CLIMATIC CONDITIONS FOR LUCERNE.

As with most of those cultivated plants which have been domesticated for many centuries, types and varieties of Lucerne have been developed for nearly every set of natural conditions to be found in the World, and so it is almost literally correct to say that Lucerne can be successfully grown in all climates which will permit white man to live and multiply. The most favorable climates, however, are:—(1) What has become known as semi-arid, and (2) sub-tropical, and in these climates, when sufficient water is available and good management is practised, Lucerne gives its maximum returns. If very high yields of forage are being sought from Lucerne, it is essential that it be grown in districts where the winter weather is mild, for then growth is made by the plants during practically the whole year, whereas if much cold is experienced, the growing period is considerably lessened. In ideal lucerne-growing conditions it is possible to average seven hay cuts a year, but in very cold places, as, for instance, in the farthest-north lucerne-growing districts of Canada, only two cuts are expected.

The climate of all parts of South Australia is well suited to the growth of the ordinary type of Lucerne, and the limitations that exist as to the production of the crop, depend on water and soils and not on climate.

WATER REQUIREMENTS OF LUCERNE.

Lucerne being a summer-growing plant which produces a number of strong growths during each season if regularly cut or grazed, requires an enormous amount of water if it is to reach maximum development. The amount of water required by most cultivated plants has frequently been measured, and is usually expressed as the transpiration ratio, which means the amount of water required by the plants to produce 1lb. of dry matter. Dr. A. E. V. Richardson found in Victoria that in a year when wheat had a transpiration ratio of 231lbs., Lucerne had a ratio of 819lbs., and the figure for Oats was 332lbs., Peas 283lbs., and Rape 355lbs. He also found

that the transpiration ratio is double or even treble in mid-summer what it is for Lucerne grown in the winter. The great amount of water that can be utilised by Lucerne means that in semi-arid climates full returns are only secured from the crop if irrigation water is available, or if good underground water is not too far from the surface. On the other hand, although the plant can use a lot of water, it can make a wonderful bulk of growth on a comparatively small amount. If good underground water is to be found at least 4ft. from the surface, and not deeper than 8ft. to 12ft., there is no need for much moisture near the surface, except for the germination of the seed and the starting of the crop. Lucerne is a rather remarkable plant in that, although it can utilise a large amount of water, there are few of the cultivated plants able to withstand dry periods for such a long time, and then rapidly recover as soon as rain falls or irrigation water is applied. It is one of the most drought-resistant of the cultivated crops on the one hand, and on the other one of the best of crops to utilise heavy irrigation.

GOOD LUCERNE SEED IS A NECESSITY.

Lucerne being a crop that has to last for many years, it is essential that a good stand be secured in the year of seeding down the crop, and to make sure of this the best seed is a necessity. It is generally recognised by experienced Lucerne-growers that thorough soil preparation is necessary to ensure a good stand, but all the work expended in the production of a good seed-bed is wasted if poor seed is to be sown, because a good stand cannot be secured from such seed.

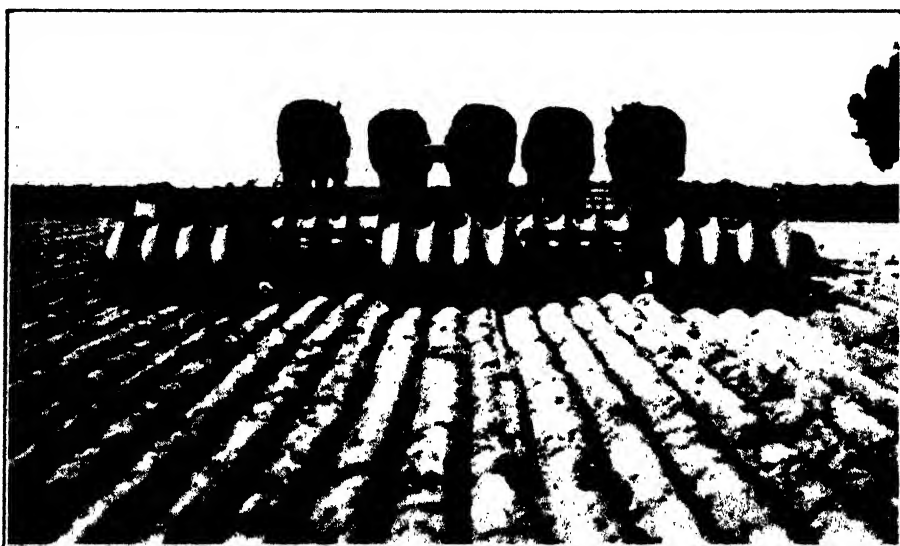
Only seed of a really bright appearance should be used, and preferably it should be a true yellow with an occasional tint of light green, because this is a sure indication that it was properly matured and harvested in favorable weather. Seed which is decidedly green was probably harvested before fully ripe, or else had suffered from a frost as it approached maturity. The brightness of the seed fades with age, and it usually becomes darker as well as dull-looking, whilst on the other hand immature seed is usually of a distinctly green color, even when it is not badly shrunk through being harvested too soon. It is generally recognised that the germination power of the seed becomes less and less as the brightness of the seed is lost, and a large percentage of brown seed indicates poor-germinating seed. Occasionally, otherwise good samples contain a fairly considerable proportion of "hard" seed, i.e., seeds which will not germinate in the year of seeding, because their skins have become so hard that they prevent the absorption of enough moisture to lead to their germination. If there is any suspicion that "hard" seed is present, it should be refused, or else a germination test made, and if it is found that the proportion of seed which will not germinate is at all appreciable, a supply from another source should be sought.

A germination test is readily carried out by filling an ordinary saucer with sand, covering it with blotting-paper or a piece of cloth, moistening it with water, then counting a given number of seeds and placing them on the blotting-paper or cloth. If the saucer is now placed in a position where the variations of temperature are not very great, the good seed will germinate in from three to seven days, and if those that germinated are removed, it should be a simple matter to count the others and calculate the percentage germination.

Besides good germinating power the Lucerne seed should be quite free of seeds of Dodder and field weeds.

ESTABLISHING THE LUCERNE CROP.

Lucerne is such a hardy plant in almost every way that it is not difficult to establish good stands of it in any soil or in any suitable climate, provided ordinary care is shown, and so much is now known about all phases of the growing and management of the crop that stands of it should be secured with the same certainty as is the case with the cereals. Although it is usually quite an easy matter to get a good stand of Lucerne, it behaves as do practically all other cultivated crops, in that the better the preparation and care shown, the better the results secured. As a rule the Lucerne crop is seeded with the intention of producing a thick stand that will be maintained for a great number of years, and as the life of the crop depends upon obtaining a good stand in the year of establishing it, maximum results will only be attained if the very best soil preparation is given, high quality seed is used, the seeding is carried out at the correct time and in the best way, sufficient fertiliser is applied, and everything necessary is done in a proper manner. That this great care is fully justified for long-lived stands



PREPARING THE LAND FOR SEEDING WITH LUCERNE.—The Culti-packer is a suitable implement to pulverise and consolidate the surface soil, and so create an ideal seed-bed.

of Lucerne is easily realised when it is remembered that in good lucerne-growing conditions it is possible to maintain profitable stands for 30 years and upwards, and so any expenditure incurred in establishing the crop becomes but a small annual cost when split up over its life.

PREPARATION OF THE SOIL FOR SEEDING WITH LUCERNE.

The method to be adopted in preparing the land for seeding with Lucerne varies very considerably as to whether the crop is to be grown on sandy or heavy-textured soils, if to be irrigated or grown with the natural rainfall, if to be maintained as a long-time stand or as a short-period rotation crop, and whether the district is well supplied with rain or otherwise. Whatever the conditions, however, it is of the utmost importance that some soil preparation be given, and in most cases the more thorough the preparation the better the results, and in this connection it is unquestionably a fact

that more failures of Lucerne crops are due to poorly-prepared seed-beds than to all other causes. In a general way the ideal seed-bed in which to sow Lucerne consists of very fine soil almost free of clods, about 1in. to 1½in. in depth, resting on very compact underlayers; the compactness and the smoothness at the surface being the two essentials to ensure a good and regular germination of small seeds, such as those of Lucerne.

HEAVY-TEXTURED SOILS.

In preparing heavy-textured soils and all soils not liable to drift a good deal of work is required, because after these soils are stirred up many of them require a lot of handling to pack them together again, and to break down their excessive cloddiness.

If it is intended to irrigate the crop, the levelling of the land should be done some time before seeding, preferably some months before, so that the patches where the underlayers have been exposed will have time to become mellow. Some little time before seeding the land should be irrigated to germinate weeds, which will be killed with a cultivator. Another irrigation will now be given, and as soon as the soil is dry enough to carry implements, it should be cultivated and worked into good seeding condition, and the seed should be put in whilst the land carries enough moisture to lead to a full germination.

Where underground water is found at a reasonable depth under heavy-textured soils, as is the case in many of the flats in our North, between Burra and Mannanarie, the soil treatment necessary depends on the presence or absence of weeds. All land foul with weeds should be bare-fallowed for a whole season, by ploughing in July or August, and then cultivating or harrowing every time weeds are in evidence or a crust has formed on the surface after a rain. Under such treatment an ideal seed-bed free from weeds should result, and the soil will be in good heart, to give the Lucerne plants a really strong start. Where it is known that the soil is fairly free from bad weeds, the ploughing can be done in the winter, and a good seed-bed be prepared by the spring in time for seeding while the soil is still moist. To help reduce the surface to a fine tilth and to pack the underlayers, a culti-packer of some kind is very useful, although a corrugated roller, or for that matter, even a plain roller, will do the job, but not quite so expeditiously.

When preparing heavy soils where the crop is to be grown with the natural rainfall, and particularly in those districts where the average annual rainfall does not exceed 25ins., bare-fallowing for a full season is essential if the very best returns are to be secured. Where the rainfall is greater, and weeds not bad, a short fallow of about three months gives plenty of time to prepare the seed-bed, especially if a cereal crop immediately precedes the Lucerne.

LIGHT-TEXTURED SOILS.

In the preparation of the light-textured soils liable to drift, such as sands and "fluffy" calcareous soils, the difficulty of securing a full stand is increased, because of the danger of the young seedlings being buried or injured by the drifting soil particles, and so it is advisable to adopt different practices than for the firmer lands.

When irrigation is to be availed of, much the same methods as for heavier land can be utilised, because the soil can be kept together with artificial watering, but the levelling will be done immediately prior to the watering given to germinate the weeds, so as to reduce the chances of drifting.

Where the crop is to be grown by natural rainfall or on underground water, best results are secured by seeding these light lands to a cereal the season before the Lucerne is to be sown. The stubble is allowed to remain, or at all events is not over-grazed by livestock, and if the soil is of a very loose nature a mixture of seed and superphosphate is drilled in with a disc-drill in the following autumn without any previous cultivation. A trip with the culti-packer or roller over the land before the seed-drill is used, helps to consolidate the land and leads to better results. If the land is not very loose and drifty after the cereal crop, and many weeds appear after the first autumn rain, a light disc-harrowing does much good, but it must be remembered that it is quite essential to leave enough stubble on the surface of the land to protect the young Lucerne plants from drift.

When land that is known to be infested with Lucerne Flea is to be seeded in the autumn with Lucerne, it should be properly bare-fallowed to rid it of the pest, and to do this it is essential that no weeds of any kind be permitted to grow. Fallowed land is rarely affected badly by the Lucerne Flea, because infestation can only come from the edges of the plot, where the insects hatch out, and it takes some time for them to travel any distance.

METHOD OF SEEDING LUCERNE.

Lucerne is usually seeded by drilling in the seed or broadcasting it on the surface and covering it with an implement, but it is found for almost all conditions that drilling is much the better of the two methods. The seed being so small it is absolutely essential that it be seeded to only a shallow depth, and the drill does this with more uniformity than can be achieved by any other system. Besides planting the seed at a uniformly shallow depth, which should not exceed 1 in. except in very exceptional circumstances, the seed can all be placed by the drill on the firm soil immediately below the top loose tilth, it is evenly distributed, and is covered for a certainty, all of which help to promote a fuller and more regular germination and so a better stand. Where other agricultural crops with small seeds as well as Lucerne are grown in quantity, a grass-seed attachment for the ordinary seed-drill is warranted, and helps in the even distribution of Lucerne seed through the drill, but sufficient regularity of seeding is secured if the seed is sown in admixture with Superphosphate, through the manure-box of the ordinary seed-drill. If the soil was properly prepared before drilling the seed there is no need for further treatment, but if it is still loose and open it could be culti-packed or rolled with advantage, although it is usually much better to do all the packing of the land before seeding rather than afterwards.

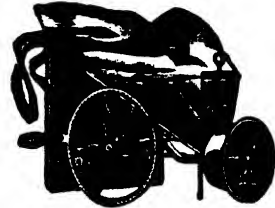
If fairly large areas are to be seeded by broadcasting, a small machine known as a "Cahoon" Broadcaster, which is carried by straps over the shoulders and rests against the chest of a man, is quite suitable for the purpose and leads to a fairly regular distribution of the seed. Broadcasted seed should be immediately covered with a light harrow of some kind, and advantage would usually follow a culti-packing or rolling and another light harrowing.

In low-rainfall districts where the Lucerne plants get no moisture other than the rain which falls, the crop is sometimes grown in rows sufficiently widely spaced to be able to cultivate the land between the rows. With this treatment much greater returns are secured than if the whole land is covered and the plants left to themselves. It appears at present that this method of growing the crop may be useful to increase the yields of seed in our seed-growing districts of low rainfall and high temperatures. It can be practised with advantage for the production of a small amount of summer greenfeed, on wheat-growing farms in low-rainfall districts. The seeding would be done by running the mixture of Superphosphate and seed through every third hoe of the ordinary seed-drill, and the cultivating could be done with a single-horse hoe if the area was small, and for larger areas with a multiple-row cultivator or any ordinary farm cultivator with lucerne-cultivating points.

TIME OF SEEDING LUCERNE.

Lucerne can be seeded either in the autumn or in the spring, and in those places where winter or early-spring frosts are extremely severe it is necessary to sow the seed in the spring, otherwise the young seedlings might be killed by the frosts, but fortunately this does not apply to the lucerne-growing districts of South Australia, and consequently the crop

CAHOON SEED BROADCASTER.—Suitable for broadcasting small agricultural seeds such as Lucerne, where the areas to be sown are too large to be done by hand.



can be started, in practically all places, in the autumn. Where this can be done it usually proves advantageous, because autumn sowing generally means, for all districts where irrigation is not practised, a more regular stand of lucerne, less weeds, much more forage the first year of the crop, and less damage during the first summer should it prove an extremely dry and hot season. For areas to be irrigated the seed can be sown whenever convenient to the grower, but here also the advantages lie with autumn-sowing. In the heavier-rainfall districts of the State the crop can be established conveniently in the spring, and the land is then prepared by ploughing it in the autumn or early winter, breaking it down in the early spring, and seeding when the soil has warmed up in October.

In most places where Lucerne is grown the seeding should be done in April if a good germinating rain falls, and if this is not possible it should be carried out by the middle of May. In some few localities, where the rainfall is light and the soils of a more or less sandy nature, the seeding can be done throughout the winter, even during July and August.

QUANTITY OF LUCERNE SEED TO USE.

No general recommendation can be made as to the quantity of Lucerne seed required, because it will vary so much with the location, and the management intended for each stand. For long-time stands, it is desired

to keep a thick, dense crop for as long a time as is possible, and as all Lucerne plants are not equally long-lived, some only lasting one year, some two years, some ten years, some twenty years, and so on, it is essential that plenty of plants be provided at the beginning, so that it takes a considerable time before the stand becomes unprofitably thin. On the other hand, if the stand is only required for a short period in a rotation, or is to be grown in low-rainfall country where crowded plants would rob one another of moisture, it would be quite wrong to use much seed when establishing the crop.

In South Australia: (*a*) where full irrigation is practised about 20lbs. of seed per acre should be used; (*b*) where irrigation water is used but in limited quantity, and where the crop is grown on good underground water, as in the country between Burra and Mannanarie, about 12lbs. to 15lbs. per acre is sufficient; (*c*) on the sandy land overlying underground water at 6ft. to 12ft., as at Narrung and around Lake Albert generally, 9lbs. to 12lbs. per acre is enough; (*d*) on the heavy-textured and calcareous wheat lands of the State 6lbs. to 8lbs. per acre will give good stands; whilst (*e*) on the sandy wheat-growing soils of the Mallee, 4lbs. to 6lbs. per acre will provide much forage for a number of years.

The quantities of seed mentioned for the different sets of conditions are dependent upon reasonably good soil condition being produced before seeding, and if for any reason sufficient preparation has not been given, at all events on the heavy-textured soils, more seed will be necessary, but it must be remembered that increasing the amount of seed does not counteract insufficient soil preparation. Again, if anything but the very best seed is being used the amounts must be increased.

Broadcasting the seed, and the inevitable irregular covering of it with harrows or other implement, means that it is necessary to use more seed than with drilling, if equal stands are to be secured, and in this connection the figures given above must be taken to refer to drilling.

“NURSE” CROPS FOR LUCERNE.

Most people who still advocate the use of a “nurse” crop when establishing Lucerne, do so on the grounds that the young plants require protection from frost, but because frost-damage is of such very rare occurrence in this country, there are only a few occasions when benefit of any kind is obtained from the practice. As a matter of fact, it is common experience with lucerne-growers, that “nurse” crops, no matter how thin they might be, retard the young Lucerne plants, and if the “nurse” crop makes strong, thick growth, and shades the young Lucerne plants for any length of time, many of the latter die, and in some cases whole stands have been killed right out. In nearly all cases it is preferable to prepare the land well, and sow the Lucerne seed by itself, and it will be found that the young plants are quite capable of withstanding the coolness of our winters and the heat of the summers, better than if other plants are present to protect them.

If sandy land, liable to drift, is to be seeded to Lucerne, without having a cereal crop preceding it, a light “nurse” crop will probably save some of the young plants from being cut off by the drift. In these cases about

15lbs. of Barley or 20lbs. of Wheat are enough to give ample protection to the young Lucerne plants, and it is essential that the crop be cut or grazed off not later than the middle of November.

In heavy soils which crust over very readily, the young Lucerne plants sometimes have difficulty in pushing their way above-ground, and in these conditions it is often of advantage to sow a cereal with the Lucerne. In such cases the cereal seedlings emerge without trouble and open up the way for the young Lucerne plants. For the purpose, 15lbs. to 20lbs. of any one of Wheat, Oats, or Barley is sufficient, and the cereal must be removed by cutting or grazing before it matures.

INOCULATION OF THE SOIL FOR LUCERNE.

In all countries where Lucerne is grown on soils deficient in lime, it has been found necessary to introduce to the soils the bacteria which live on the roots of Lucerne and collect nitrogen from the air, and until this is done the Lucerne does not thrive. The act of introducing the bacteria has become known as *Inoculation*. Fortunately it has not been found necessary, so far, to practise inoculation anywhere in South Australia, because it adds to the expense and trouble of establishing the crop, and in all places in the State where tried it has been impossible to see a benefit for the operation. There appears to be no way of knowing whether land needs inoculation or not, except that on all soils very deficient in lime it seems to be required, if Lucerne is to grow at all well.

If we ever find it necessary to inoculate the soil for Lucerne, and we may have to do it in the Adelaide Hills and parts of the South-East, the job can be done by distributing soil from a field where Lucerne has grown well. It is usual to apply 300lbs. or 400lbs. of soil per acre, and it is collected by removing the top inch of soil from a Lucerne field, and then taking the next 3ins. or 4ins. of soil. The soil can be distributed by broadcasting or drilling immediately before seeding the land to Lucerne.

MANURING WHEN ESTABLISHING LUCERNE.

Farmyard manure is a very suitable fertiliser for Lucerne, but should be applied to the crop after it has been established rather than beforehand, except when it is really well-rotted and is ploughed into the land some months before the Lucerne is to be seeded. Unless these precautions are taken many weeds will germinate with the Lucerne, and thin-out the stand. When establishing a crop of Lucerne there is no better fertiliser to apply than Superphosphate, and in practically all cases there is no need to use any other manure. In good lucerne-growing conditions, 2cwt. Superphosphate (45 per cent.) per acre can be drilled in with the seed, and a reduced quantity for other conditions right down to about $\frac{3}{4}$ cwt. in sandy soils where the crop is only to last four or five years.

LIME FOR LUCERNE.

Lucerne takes an enormous quantity of Lime from the soil, so much so that, probably weight for weight, it removes more than does any other cultivated crop which grows well in similar conditions. This means that if an attempt is to be made to grow Lucerne in a soil deficient in lime the shortage must be made good before the crop will be a success. Although

lime, in the form of air-slaked lime or ground limestone, can be advantageously applied to growing Lucerne, it is usual to make up the shortage before seeding the land. This is generally done by broadcasting about 2 tons of lime per acre after the land has been ploughed and cultivated, and some little time before seeding, and then harrowing it into the seed-bed.

AFTER-SEEDING TREATMENT OF LUCERNE.

Autumn-sown Lucerne that is grown for cutting needs practically no after-seeding treatment, at all events not until the spring, because any weeds which appear should be left during the winter, but they should be cut with a mower before they produce seeds, and be carted from the plot. From then onwards the plot will be cut in the ordinary way.

Spring-sown Lucerne that is grown for cutting needs some care bestowed upon it during its first year, for it must be cut often enough to prevent the weeds from choking it out, and at the same time it must not be cut so often that the roots are prevented from developing because of the want of leaf growth. In hot, dry years a spring-sown Lucerne stand in which many weeds are growing can be spoilt by a too-close cutting, thus exposing the young plants too suddenly to the fierce sunlight, after having been protected and shaded for so long by the weed growth.

Very little can be done one way or the other to a new stand of Lucerne grown for grazing purposes. During its first year it should be grazed rapidly each time that stock are put on it, and then be spelled until good strong growth has again been made, and on no account must stock be allowed to remain until they begin to pull up the plants, and on heavy-textured land stock should be kept off the crop when the land is wet.

New stands of Lucerne should not be cultivated in any way, and in most cases harrowing is all that will be required before they start making spring growth in their second year.

MANAGEMENT OF THE LUCERNE CROP.

Successful Lucerne growing consists chiefly in maintaining a profitably-thick stand for a long period of years, and in producing heavy crops of forage every year of the life of the stand. These two requirements are only met if a definite system of management is followed for each particular stand, but there are certain practices which local experience has shown to be applicable to most lucerne-growing districts, and the variations from the general rules are not very great except in a few isolated instances. Once a good stand has been established in reasonably suitable lucerne-growing conditions, attention must be given to its cultivation, the addition of manures, and to the cutting or grazing of the crop, if maximum returns are to be obtained, and some knowledge is required as to when and how to thicken up a stand if it be rather too thin at the start.

CULTIVATION OF THE LUCERNE CROP.

In all of the heavy-textured soils in which Lucerne is grown it is found that it pays to cultivate the Lucerne crop, just as it does other perennial crops and most strong-growing plants. This job should be done very thoroughly with an implement which will stir up these heavy soils without tearing the crowns of the plants too much. A few years ago it was con-

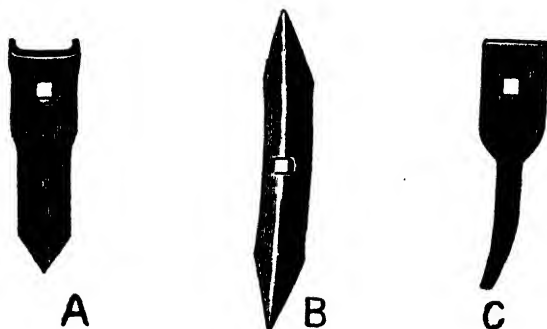
sidered good practice to use a disc cultivator with the full intention of splitting the crowns as well as stirring the land, but it is generally recognised nowadays that although splitting the crowns does not do a great deal of damage, it is better to leave them unbroken. For the purpose the rigid-tine cultivator with very narrow shares does the work very well, and will penetrate the soil no matter how heavy the texture, if the operation is carried out in July or August, just before the crop commences to make its first spring growth. The spring-tine cultivator fitted with special lucerne-cultivating points does the job fairly well, particularly when the soils are in ideal condition so far as moisture is concerned. Cultivation should not be given during the first year of the life of the stand, but the soil can be lightly stirred before the next spring. Harrowing after grazing or cutting always does some good, particularly so after the tramping of grazing livestock.

There is not the same need to cultivate Lucerne which is grown on light-textured soils, but very thorough harrowing of the surface at least once a year does much to keep the stand in good condition.

Cultivation helps the Lucerne crop, because—

1. It loosens the soil, so admitting air and water more readily, and reduces the losses of water by direct evaporation from the soil. This loosening is particularly useful where the crop has been grazed, because livestock tend to overpack the surface of the soil.

CULTIVATING LUCERNE.—Points suitable for fixing to implements for cultivating Lucerne without injuring the plants. A & C for spring-tine cultivators. B for rigid-tine cultivators.



2. The roots of Lucerne must breathe, and the useful soil bacteria living on the roots must have access to the nitrogen of the air, so that anything tending to increase the supply of fresh air to the soil is of the utmost importance.

3. The organic matter, in the form of leaves and animal droppings, is more or less evenly spread and incorporated with the soil, instead of being left in heaps on the surface.

4. The eggs and larvae of insects which affect the Lucerne plants are destroyed in large numbers by breaking them up, and by exposing them to weather and birds.

MANURING THE LUCERNE CROP.

All forms of farmyard manure stimulate the Lucerne crop and lead to greatly increased growth, and such manure can be applied at any time during the year, provided it is added soon after a cutting or grazing so

as not to foul the forage. If the crop is to be cut for green forage or for hay the manure should be well rotted, because if there is much straw or coarse matter in the manure, it not only interferes with cutting, but fouls the forage, becoming mixed with it whilst being collected with rakes or forks. Bird droppings constitute an extremely good form of farmyard manure for applying to Lucerne crops.

Whether farmyard manure is available or not benefits are to be secured from applications of superphosphate in practically all parts of the State where Lucerne is grown, and it is becoming generally recognised that it is good practice to drill superphosphate into the land immediately after cultivating it during the winter. In good lucerne-growing conditions, either where irrigation is practised or where the crops can draw on a good underground water supply a few feet from the surface, an annual dressing of 2cwts. Superphosphate (45 per cent.) is warranted. Where the conditions are not so good the amount of Superphosphate used can be reduced until it reaches as low as 56lbs. per acre per year for the short-period stands on the sandy wheat-growing lands of the Mallee districts.

CUTTING OR GRAZING THE LUCERNE CROP.

Lucerne is almost an ideal forage crop for cutting and carting to livestock, and, on the other hand, in our climate, it is also fairly suitable for being grazed off by the animals. There is no shadow of a doubt, however, that greatest stock-carrying returns are secured by cutting and carting to livestock, and that the stands last much longer if treated in this way, but in such a country as ours it is often an uneconomic proposition to follow this practice as against grazing the crop. It has become usual in this State, when Lucerne is grown under irrigation for dairy cows, to cut and cart the forage to the cows, but when unirrigated, and to be used by sheep or other farm animals, it is usually grazed off.

Grazing invariably shortens the life of the stand as against always cutting the crop, and at the same time produces less forage each season. When Lucerne is cut at the correct time, the buds at the crowns have just burst, and the shoots grow uninterruptedly and very rapidly to again attempt to produce a crop of seed, whereas when stock graze down the crop they eat the soft portions first, including the young shoots just leaving the crowns, and in all probability before they have consumed all the woody stems these young shoots have been nipped off two or three times. This preventing the new shoots from growing to any length, retards the growth of the plants very considerably, and whereas cut Lucerne will again be ready to cut in 20 to 25 days in the height of the season, grazed crops in the same conditions will probably be eight or 10 days later.

THE ADDITION OF OTHER CROPS TO LUCERNE.

Where Lucerne is grown for grazing purposes it is becoming an increasingly popular practice to sow one of the cereals in the crop each year, to add to the amount of forage grown in the winter and early spring. It is generally recognised that this extra cropping will shorten the life of the Lucerne stand, but it is claimed that the greatly increased crop is full compensation for this. In the heavy-textured lands of the northern districts, the fields are thoroughly cultivated during May, and about 1bush.

to 1½ bush. of Oats are drilled in to the acre with about 2 cwt. Superphosphate. The resulting crop is usually grazed very heavily with sheep well into the spring, by which time the Lucerne gets the upper hand. In some cases the Oats are allowed to come to head, when the mixture of Oats and Lucerne is cut for hay. In the lighter sandy soils, the land is thoroughly harrowed, and about 1 bush. of Barley, usually one of the two-rowed type, is drilled in to the acre with about 1 cwt. Superphosphate. The Barley is often allowed to mature sufficiently, so that a mixed hay is cut, which is used as the winter feed for cows or sheep, and the Lucerne crop is grazed from then onwards.

THICKENING-UP A THIN STAND OF LUCERNE.

Unless a regularly-dense stand of Lucerne plants is secured in the year of seeding, it is hopeless to expect the stand to last for the long period usually desired. If for any reason the germination of the seed is irregular, it is certainly good practice to re-seed the thin patches. These patches should be lightly cultivated up, preferably with harrows, seed broadcasted over the areas, and very lightly covered. The re-seeding must be carried out while the existing plants are young, because great difficulty will be experienced if attempt is made to thicken-up a stand of Lucerne by re-seeding, once the crop is properly established and the plants are getting old, no matter how thin the stand is.

RE-ESTABLISHING A LUCERNE STAND.

In nearly all places where a Lucerne stand which has persisted for a number of years becomes too thin to be profitably left, and it is desired to re-establish the crop, some trouble is met with, and it is usually found to be practically impossible to get a full stand immediately after ripping up the old plants. To ensure a full stand, the land carrying the thin crop of Lucerne should be ploughed so well that most of the old plants are killed, then be made to carry two non-leguminous crops in succession, before again endeavoring to get the Lucerne crop started. Where the Lucerne is being grown with the aid of irrigation water it is often possible to produce the two other crops in a little over one year, by seeding the land, after the original ploughing and cultivations, in the autumn or early winter with an early wheat for hay, cutting and carting it out of the way as soon as possible, immediately ploughing and working down, and seeding to Maize or some such crop, ploughing again in the early autumn, re-levelling and seeding to Lucerne as soon as properly prepared. If most of the old Lucerne plants were not killed by the original ploughing and working, it may pay to delay the seeding of the new Lucerne crop until the spring, when the land would be cultivated as frequently as is reasonable after the finish of the Maize crop and before seeding the Lucerne. Where irrigation is not being practised it will take two years to prepare for the new Lucerne crop: the first year Wheat should be grown, and this can be followed by Oats for hay in the heavy-textured land, and Barley for grain in sandy conditions.

LUCERNE-GROWING UNDER IRRIGATION.

In countries and districts where the climate is dry and hot and where ample good irrigation water is available, Lucerne reaches its maximum production, and in such climatic conditions the soil requirements consist only

of the need of good natural drainage and the presence of plenty of lime. Although Lucerne can profitably utilise a heavy supply of water, both of rain and by irrigation, it demands good drainage and very quickly suffers if an excess of water lies on or in the soil for even a few days, and as a consequence, when the crop is to be grown with the aid of artificial watering, the first essential is to ensure good drainage. Having selected the site for irrigating, the method of applying the water must be decided upon, because the amount and kind of soil preparation depends upon this factor.

METHOD OF IRRIGATING LUCERNE.

There are a great number of different methods of applying water to crops, but most of them are only suitable for very small areas and when special circumstances exist, and are too expensive or otherwise unsuitable for utilisation in the growing of large-field crops, such as Lucerne. For a perennial crop that has to be cut or grazed several times during the season, the only practicable methods of economically applying water are by:—

- a. Flooding the land,
- b. Using overhead sprinklers, or
- c. Running the water in furrows, and

one or other of these systems can be availed of for the growing of Lucerne. Which of these methods will be undertaken will depend on several factors, the principal of which are the soil type, the quantity of water available and the rate of supply, the contour of the land, the area to be watered, and the quality of the water.

Where plenty of water is available, both as to total quantity and the rate of supply, for all fairly level soils which are of sufficiently heavy texture so that they do not "wash" badly, and on the other hand do not set too hard on drying, the best method of irrigation is by flooding. On sandy lands and those that are liable to "wash," where water is limited, where the flow of water is relatively small, or where the slope of the land is more or less steep, overhead sprinkling or watering in furrows should be practised. When soils of that heavy sticky nature which set very hard when dry are to be used for growing Lucerne with irrigation, the crop should be sown in rows and the water run in furrows between the rows, otherwise before seeding with the crop the texture of the land should be improved with applications of lime, gypsum, or heavy dressings of farm-yard manure. If the area sown to Lucerne to be irrigated is fairly considerable in extent, overhead sprinkling will be found to be too expensive, and flooding will usually be adopted as the method of applying the water.

PREPARING THE LAND FOR IRRIGATED LUCERNE.

When land is irrigated by flooding it is carried out by filling level, dish-like plots, known as checks, or is distributed over the land by small ditches, or by movable pipes. In the former case much preparatory soil work is necessary, and the system is only economically possible on land that is comparatively level to begin with. The whole area to be irrigated is divided into checks, about half a chain wide and 5 to 7 chains long, by check-banks, the length of the plots being down a slight fall if it exists, but preferably the land should be nearly level in all directions, otherwise high

check-banks are required at the bottom end. The land is ploughed deeply, and so well cultivated that it is very free and loose, to facilitate the work of making check-banks and levelling the surface of the land. When in fit condition, the check-banks are made at right angles to the water channel if the land is level enough, and then the checks will all be rectangular in shape, but if the land is uneven or has a fairly considerable slope, the check-banks are made so as to follow the contour of the land. The check-banks can be made by striking-out and crowning-up with a single-furrow plough, and then filling in the furrows, and rounding them off with the leveller, when levelling the checks. An ordinary road-grader fitted with a longer blade does this levelling well, or a specially constructed soil-leveller can be made as follows:—Three planks 12ft. long and 12in. wide are fixed about 18in. apart, and parallel to one another, the front plank being sloped 45° forwards, the middle one sloped 45° towards the back, and the back one being vertical. The middle plank is 1½ins. in thickness and the others 2ins. thick. The planks are fixed together with struts and bolts, near the ends and in the middle, and carry a platform about 6ft. long and 2ft. wide at the middle at right angles across the top of the planks. This platform protrudes about 2ft. behind the back plank, and about 18ins. past the top of the first plank, and is used for the driver to walk backwards and forwards to control the levelling operations. All three planks are plated with iron, and the middle plank extends ½in. (no more) below the bottom level of front and back planks. By walking on platform towards the team, the driver makes the front plank cut into the soil, and when on back of platform the front is tilted up and the implement does not “bite” into the land. Two chains, with large links, and about 3ft. in length, are carried on the end bolts which keep the planks together, and are the points from which the team pulls the leveller. If the pulling point on one chain is taken back near the front plank the leveller is drawn obliquely, and the soil is delivered at one end to make check-banks, instead of regularly spreading the collected soil as happens when the implement is pulled square on.

The levelling must be done carefully so that no knobs are left more than 3in. higher than the general level of the ground. As it is of the utmost importance that the check-banks and the grade given to the land be disturbed as little as possible, all cultivations given after levelling must be lengthways with the checks, and never across the check-banks or round and round the checks. The growing of Lucerne by flooding in checks enables maximum returns to be secured, and the work of applying the water is considerably simplified, but the initial work of preparation is heavy and in some cases fairly expensive.

When flooding is to be practised without check-banks, the land must be fairly level, and the distribution is then done by means of small temporary ditches or by movable pipes. In both cases the land is very thoroughly cultivated, and any prominent knobs are removed and all noticeable hollows filled, with a leveller or buckscraper scoop. In the case of small-ditch irrigating, the water is let on to the land from the main channel at suitable places, and is distributed by small ditches, which are made with a small plough or by hand with a hoe or shovel, along the high places in the field. The water overflows from these ditches, and providing a good deal of care and attention is given by the irrigator, fairly even distribution of water can be accomplished. This system has the advantage that the initial cost of preparation is very low, but the application of water is fairly expensive,

because a man can only attend to a comparatively small area, and the distribution is rather uneven. The number of ditches used is enormous, but they are so small that they do not interfere with the ordinary field operations connected with Lucerne-growing, and after the initial watering it is only necessary to see that the ditches are kept open, and that the water has a free run.

Where the water for irrigation is obtained from wells on the property, or is reticulated by pipes instead of in open channels, a suitable method of distributing the water is by means of movable pipes. Depending upon the area to be watered, the size of the pipes varies, but they usually consist of galvanized-iron downpipe, 4ins. to 8ins. in diameter, in short lengths easily handled by a man, which push together, the joint being made by a short piece of canvas hose fixed to one end of each pipe. The distributing line of pipe is shortened or lengthened as required. According as the land is well graded or not, so will small ditches through the crop be necessary to help in the regular distribution of the water.

If Lucerne is to be irrigated in furrows, it is usually grown in parallel rows, and the spaces between the rows are opened up as small ditches to carry the water. If the land has a regular and gentle grade the rows can be made as straight lines, but if the land is irregular they should follow the contour lines. This is an excellent manner in which to grow Lucerne, where water is limited, and where soils are light and liable to wash. It is very easy to prevent over-irrigation, and if cultivators are put on the land soon after every irrigation, fairly saline water can be used, and the rise of salt from saline lands is delayed. Sometimes the Lucerne is seeded as a full crop, and after germination shallow furrows parallel to one another are made in the crop. The spacing of the rows depends on the soil type, being much closer in heavy-textured soils where the tendency to soak sideways is not great, and wide apart in light, open soils. These furrows are cleaned out each season, and so become permanent ditches to carry the water.

Where the land is steep, uneven, liable to wash because of being loose and open, and the areas not large, irrigating by overhead sprinklers is often availed of. The only soil preparation necessary is to fill hollows, and reduce prominent knobs. This method of watering is more economical of water than any other, and so is useful where the water supply is very limited, and is usually practised where the water is expensive.

SEEDING LUCERNE THAT IS TO BE IRRIGATED.

No matter what system of irrigating is to be practised, considerable expense is incurred in preparing the land and providing the water and the means of distribution, and so it is essential that a good thick stand of Lucerne be secured in the year of seeding. To ensure a really good germination of the seed the plot should be irrigated beforehand, and as soon as implements can be safely put on the land the seed-bed should be prepared, and the seeding be carried out while there is still sufficient moisture in the ground to lead to a full germination. If for any reason the moisture should dry out to the extent of making a full germination doubtful, the land should again be watered rather than risk a poor stand. It is a matter of common experience that much better results are secured by irrigating before seeding, and that trouble with the germination is to

be expected if the watering is left until after the seed has been put in. If the land is weedy, an irrigation should be given to germinate the weeds, and after they have been killed with cultivators, the pre-seeding watering should be given. About 20lbs. of seed should be drilled in to the acre in admixture with 2cwts. Superphosphate, being certain to run the drill rows in the direction of the flow of water, otherwise the rows of Lucerne plants will retard the run of the water instead of facilitating it. The seeding should be done in the autumn, when the first-year Lucerne will give nearly as high a return as older stands.

IRRIGATING THE LUCERNE CROP.

The system adopted for irrigating the Lucerne crop has something to do with the amount of water used and the time of application, but not nearly so much as does the quantity of water available, and the type of soil in which the crop is being grown. Although the crop is able to utilise an enormous amount of water in hot seasons and in fertile well-drained soils, the yields secured are not proportionate to the amount of water supplied, and the Law of Diminishing Returns applies to the yields of Lucerne received when increasing the supply of irrigation water. The amount of water available is of first importance when deciding the details of water application, for depending on this is whether maximum returns per acre will be sought or whether maximum returns for available water will be the aim. In his experiments, Samuel Fortier found that 30ins. of water applied to one acre of Lucerne gave a return of about 14,400lbs. of hay, whereas when the same quantity was applied to five acres, the return was about 64,100lbs. of hay. When plenty of water is at hand frequent and heavy applications can be given, but when water is scarce it would probably be better to make it cover as large an area as possible. Next in importance in regard to the application of the water is the texture of the soil, because both the quantity and time of irrigating will vary with the soil, and in this connection it is usual to find that frequent waterings are necessary for open, porous soils, whilst fewer but heavier applications suffice for heavy-textured soils with good water-holding powers.

It is claimed by some Lucerne-growers that in hot climates the roots of the plants should be encouraged to go downwards as quickly as possible, and that it can be done by watering the young stands for the first two years only when absolutely necessary. This does not appear to be essential in our conditions, for where the young stands have been liberally irrigated the returns are very considerably increased, and the plants appear to live just as long as if hardened whilst young.

To get the most out of well-established Lucerne crops, water should be applied as soon as the plants begin to show that they need it. The application of water after the plants have taken on the characteristic bluish color, which is always accompanied by toughness, starts the new growth from the crowns but does not freshen up the old toughened growth. If for any reason the watering has been withheld until the crop has suffered, it should be cut and then can be watered with more advantage. In those locations where the soils are rather porous, one watering each cut in the early part of the season is all that is required, but as the season advances and the temperature increases so must more waterings be given; still, in most lucerne-growing districts of the State one irrigation per cutting gives full returns. Where only one irrigation is given for each cut, it can be

applied either just before or immediately after the cutting, and equal results can be expected from a given quantity of water. If given before cutting the crop, the flow of water is retarded by the mass of growth, and so it is usually much better to irrigate immediately after cutting, when the job can be done more easily. Some heavy-textured soils set hard and crack badly if irrigated soon after the Lucerne is cut, and in such cases the watering should be done when there is sufficient growth to properly shade the surface of the soil. Where overhead sprinklers are being used, highest returns will be secured if a watering is given a few days before and again a few days after the crop is cut. When the irrigation is being done by flooding or in streams in furrows, the flow should be nice and steady, so that the water has time to saturate the surface soil and sink into the subsoil; the flow can be faster for light-textured soils than for heavy, close-grained ones. The pace of the water should be such, in average conditions, that it takes about eight hours to run from the main channel to the bottom of the checks or rows.

The quantity of water required for the production of maximum Lucerne crops varies with a great number of factors, but in our climate and in good loam soils with fairly high water-holding power, from 30ins. to 45ins. of added water per acre will be required. The smaller quantity will be used where the water is applied by sprinklers, and will be given in ten waterings, each of about 70,000 gallons per acre. One watering would be given to the first and last cuts, and two to each of the other four cuts. The larger quantity of water will be required where flooding is being practised, and in this case six or seven applications of from 6ins. to 8ins. per acre will be given. If the watering is to be done in furrows something between these two limits will be necessary. Extremely good crops of Lucerne can be grown with less water than the quantities mentioned, but there are few locations in this State, where no underground water exists comparatively close to the surface, where maximum crops will be secured with lesser quantities. Lighter crops will be secured if smaller amounts of water are supplied, yet it will in many cases be more economical to use less water per acre, and spread the available quantity over a greater area. Where the average annual rainfall is from 16ins. to 20ins., there should be available about another 20ins. of water for every acre of Lucerne to be irrigated; more water will mean heavier crops per acre, or greater areas to be sown.

It is essential to remember that soils not well drained are quite unsuitable for growing Lucerne with irrigation, as the yield is always reduced even if the water-logging only lasts for a comparatively short time. Further, in a hot climate like ours, the plants are readily scalded, and if on a hot day, water from flooding, takes a few hours to soak into the soil, the crop is often injured. Scalding of the plants, to the extent of burning the whole of the growth, often follows the slow sprinkling of the crop, particularly if the water is a little saline, if the watering is done on a hot day when the sun is shining fiercely. When sprinkling Lucerne in the day-time, the stream of water should be such that there is no danger of the plants becoming wet and dry several times during the operation; the pressure should be such that the crop will be watered quickly, and this precaution is the more necessary the greater the amount of total soluble salts in the water.

(To be continued.) In the next issue, the article will deal with Utilisation of the Lucerne, Production of Lucerne Seed, Diseases and Pests.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on March 25th, there being present:—Messrs. F. Coleman (chair), A. M. Dawkins, P. J. Baily, H. S. Taylor, A. J. Cooke, P. H. Jones, A. L. McEwin, R. H. Martin, Professor A. J. Perkins (Director of Agriculture), Dr. A. E. V. Richardson (Director of Waite Research Institute), Messrs. W. R. Birks (Principal Roseworthy College), and H. C. Pritchard (Secretary). Apologies were received from Messrs. G. Jeffrey, H. N. Wicks, and S. Shepherd.

Sale of Bran and Pollard.—At a Conference of Southern Branches, held in August, 1929, the following resolution was carried:—"That this Conference favors the introduction of legislation to fix a standard quality for bran and pollard." The matter was referred to the Chamber of Commerce, and was taken up by the Mill Owners' Association, whose representatives stated that whilst they believed it would be difficult to establish legitimate standards for bran and pollard, because these substances were normal residues in the manufacture of flour, they recognised the necessity of protecting users from unscrupulous adulteration. Copies of legislation existing in Western Australia and Queensland have been obtained and the standards set out are as follows:—

Bran (Western Australia).—The Second Schedule of the Act quotes the following:—"Bran shall consist of the outer skin or coating of the wheat grain or berry obtained in the usual commercial milling process from wheat. There shall not be more than 1 per cent. of foreign ingredients. It shall contain (subject to the undermentioned limits of variation) not more than 10.5 per cent. of moisture, nor more than 9 per cent. of fibre, nor more than 4 per cent. of ash, calculated on a moisture content equal to 10.5 per cent. Limits of variation: Moisture and fibre 1 per cent., ash $\frac{1}{2}$ per cent."

Pollard (Western Australia).—Pollard shall be a byproduct of milling wheat, other than flour and bran, in which there shall not be more than 1 per cent. of foreign ingredients. It shall contain (subject to the undermentioned limits of variation) not more than 10.5 per cent. of moisture, nor more than 5 per cent. of fibre, nor more than 2 per cent. ash, calculated on a moisture content equal to 10.5 per cent. Pollard shall be of such fineness as to permit of 50 per cent. passing through a silk-cloth or grit gauze sieve with 24 meshes to the lineal inch. Limits of variation: Moisture 1 per cent., ash $\frac{1}{2}$ per cent.

The Act provides that the Governor may by regulations prescribe substances which shall be deemed foreign ingredients, but the Western Australian Department of Agriculture states that there are no regulations so far as bran and pollard are concerned. There is a clause in the Act which provides that if any person sells for use as food for stock any article which contains any ingredient deleterious to stock, or to which has been added any ingredient worthless for feeding purposes and not disclosed in writing to the purchaser at the time of sale, he shall be guilty of an offence against the Act.

Bran (Queensland).—"Bran shall consist of the outer skin or coating of the wheat grain or berry, pure and without admixture of any kind, obtained in the usual commercial milling process from wheat from which there shall have been removed all impurities by cleaning and scouring. (It must not contain any whole or broken wheat grain, and only 1 per cent. by weight will be allowed of any substance of a non-deleterious character other than the byproducts of wheat. Bunt, not more than 0.1 per cent. by weight)."

Pollard (Queensland).—Pollard shall consist of the products of the wheat grain or berry (other than flour or bran) obtained in the usual commercial milling process from wheat from which there shall have been removed all impurities, and shall be of such fineness as to permit of 99 per cent. passing through a metal sieve perforated with round holes 1.5mm. in diameter. (Foreign ingredients allowed: Any substance of a

non-deleterious character other than the byproducts of the wheat, 0.5 per cent. by weight. Any wheat byproduct that will not pass through a metal sieve, as referred to above, 1 per cent. Bunt, not more than 0.1 per cent.)

No proportion or amount of the following will be allowed for bran or pollard:—Ergot, plants, parts of plants and seeds of dodder, thorn apple, castor oil plant, physic nut, poppy, kahaki weed, corn cockle, Bathurst burr, Noogoora burr, or any substance of whatever character in itself deleterious to the life or health of stock. Nor any substance of whatever character added for the purpose of fraudulently increasing the weight of the foods. Nor any stock food listed as being of low food value, unless the actual amount is declared on the invoice and label. As regards moisture, the allowance is 13 per cent. by weight, unless the actual amount is declared on the invoice and label.

It was decided to ask the Director of Chemistry for an expression of opinion as to whether the legislation outlined by the Queensland and Western Australian Departments of Agriculture could be used as a basis for introducing a standard for bran and pollard in South Australia.

Conference Resolutions.—The following resolutions were received:—*Mid-North Conference*: "That an endeavor be made to have better supervision of the quality and standard of cornsacks sold by firms and issued to farmers." *South-Eastern Conference*: (a) "That it be a recommendation from this Conference that potatoes and grain, other than wheat, be allowed to be marketed in washed super. bags." (b) "In future, evening sessions be cut out, and that Free Parliament be brought on earlier after luncheon."

Ridley Memorial Scholarship.—Mr. A. M. Dawkins was re-appointed as the Board's representative on Ridley Memorial Scholarship Committee.

Life Members.—Life membership of the Agricultural Bureau was conferred upon Messrs. W. E. Rogers (Naracoorte) and R. L. C. and P. S. Sinclair (Green Patch).

New Members.—The following names were added to the rolls of existing Branches:—Pinnaroo Women's—Mrs. H. Ide; Saddleworth—Olaf Coleman; Millicent Women's—Mrs. A. Redman; Kangarilla—L. G. K. Roberts; Cummins—R. D. Olsson, W. E. Bryant, C. Williams, A. Waters, W. G. Haines, A. Williams; Yadnarc—C. J. Silvertsen; Buchanan—R. Rohde; Boors Plains—L. Northey; Bundaleer Springs—L. Seigert, E. Seigert; Springton—H. A. Kluge, L. P. Hermann; Kalangadoo—J. Hunt. No. of Branches, 305; total No. of members, 8,458.

Herd Testing Associations.—The following resolution was received from the Balhannah Branch:—"That the Herd Testing Associations be continued." The Secretary was instructed to advise the Branch that this matter was being considered by the Government.

Rail Concession on Super.—The Mid-North Conference resolved "That the Government be asked to extend the time of rail concession on super until May 31st." It was decided to forward the resolution to the Railways Commissioner through the Minister of Agriculture, with the support of the Board.

HALMEG LINSEED MEAL

20 BAG LOTS	11/ BAG	} ON TRUCKS
10-19 " "	11/3 "	
1-9 " "	12/6 "	

FINE GROUND FOR CALVES 1/- EXTRA.

STRICTLY CASH WITH ORDER.

Charles Whiting & Chambers Ltd.
13, PITT STREET, ADELAIDE.

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1930-31.
Conducted at Parafield Poultry Station under the supervision of the Department of
Agriculture.

FINAL SCORES.

Scores from April 1st, 1930, to March 31st, 1931.

SECTION 1.—WHITE LEGHORNS.

<i>Singles—</i>	Scores.	Bird Nos.
W. Wiese	279	70
A. E. Robinson	276	148
C. G. Gavin	269	135
T. G. Manuel	266	110
W. R. Williams	262	9
W. J. Mitchell	262	186
<i>Trios—</i>		
W. Wiese	748	70— 72
C. G. Gavin	734	133—135
C. G. Gavin	724	136—138
C. J. C. Burton	706	25— 27
M. E. Hutton	694	88— 90
W. Wiese	694	73— 75
W. R. Williams	690	7— 9
<i>Teams—</i>		
C. G. Gavin	1,458	133—138
W. Wiese	1,442	70— 75
W. Hill	1,338	118—123
L. E. George	1,289	193—198
V. F. Gameau	1,176	46— 51

SECTION 2.—BLACK MINORCAS.

<i>Singles—</i>	Scores.	Bird Nos.
V. F. Gameau	203	207
V. F. Gameau	182	205
V. F. Gameau	179	206

SECTION 3.—BLACK ORPINGTONS.

<i>Singles—</i>	Scores.	Bird Nos.
E. L. Osborn	245	236
W. R. Williams	245	215
A. Andrewartha	239	225
A. S. McFarlane	235	226
E. L. Osborn	215	237
<i>Trios—</i>		
W. R. Williams	654	214—216
E. L. Osborn	611	235—237
A. S. McFarlane	595	226—228

SECTION 4.—RHODE ISLAND REDS.

<i>Singles—</i>	Scores.	Bird Nos.
H. Fidge	231	242
V. F. Gameau	191	239
H. Fidge	179	241
V. F. Gameau	159	238
<i>Trios—</i>		
H. Fidge	514	241—243
V. F. Gameau	491	238—240

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1930-31.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1. White Leghorns—204 birds; Black Minorcas—3 birds.
Section 3. Black Orpingtons—30 birds. Section 4. Rhode Island Reds—6 birds.

Twelve Months Test. To start on April 1st, 1930.

Section 1.—White Leghorns, 1 to 204; Black Minorcas, 205 to 207.

Competitors.	Address.	Score for Month ending March 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Williams, W. R.	Frewville	(1) *	(2) †	(3) *	—
Williams, W. R.	Frewville	(4) 163	(5) 172	(6) *	335
Williams, W. R.	Frewville	(7) 212	(8) 216	(9) 262	690
Wilkinson, F. W.	Lower Light	(10) 238	(11) 179	(12) *	417
Wilkinson, F. W.	Lower Light	(13) 245	(14) 253	(15) *	498
Pearman, E. D.	Rosewater	(16) 163	(17) *	(18) *	163
Pearman, E. D.	Rosewater	(19) 223	(20) 215	(21) 204	642
Langmead, E. R.	Croydon	(22) *	(23) *	(24) 201	201
Burton, C. J. C.	Mallala	(25) 242	(26) 217	(27) 247	706
Heath, H. E.	Mile End	(28) 252	(29) *	(30) 207	459
Heath, H. E.	Mile End	(31) 197	(32) 190	(33) 124	511
Gurr, A. & H.	Scott's Creek	(34) 175	(35) 207	(36) 242	624
Howard, T. W.	Woodville	(37) 188	(38) 183	(39) 215	586
Osborn, E. L.	Camden	(40) *	(41) 249	(42) 231	480
Curtis, W. R.	Cottonville	(43) 185	(44) 249	(45) 228	662
Gameau, V. F.	Woodville	(46) 178	(47) 231	(48) 190	599
Gameau, V. F.	Woodville	(49) 222	(50) 148	(51) 207	577
Aird, J. R. & Son	Kilkenny	(52) 173	(53) 227	(54) 229	629
Simpson, Mrs. A. M.	Fullarton Estate ..	(55) *	(56) 152	(57) *	152
Barrett, L.	Angaston	(58) 174	(59) 177	(60) 230	581
Barrett, L.	Angaston	(61) *	(62) 157	(63) 241	398
Barrett, L.	Angaston	(64) 207	(65) 166	(66) 198	571
Lamerton, E. A.	Edwardstown	(67) 168	(68) 106	(69) 241	515
Wiese, W.	Cabra	(70) 279	(71) 246	(72) 223	748
Wiese, W.	Cabra	(73) 236	(74) 239	(75) 219	694
Bishop, O. W.	Clarence Park	(76) 221	(77) †	(78) 217	438
Uriwin, A. P.	Balaklava	(79) *	(80) †	(81) 218	218
Riggs, N.	Camden Park	(82) 236	(83) 215	(84) *	451
Riggs, N.	Camden Park	(85) 209	(86) 167	(87) 212	588
Hutton, M. E.	Clarence Park	(88) 208	(89) 241	(90) 245	694
Andrewartha, A. H.	Underdale	(91) 166	(92) 196	(93) 196	558
Vowels, C. C.	Westbourne Park ..	(94) †	(95) 207	(96) *	207
Vowels, C. C.	Westbourne Park ..	(97) 237	(98) 224	(99) †	461
Vowels, C. C.	Westbourne Park ..	(100) 240	(101) †	(102) *	240
Vowels, C. C.	Westbourne Park ..	(103) 205	(104) *	(105) *	205
Manuel, T. C.	Myrtle Bank	(106) 170	(107) 204	(108) 236	610
Manuel, T. C.	Myrtle Bank	(109) 170	(110) 266	(111) *	436
Harris, W. A.	Edwardstown	(112) 251	(113) 223	(114) *	474
Harris, W. A.	Edwardstown	(115) 201	(116) 202	(117) 190	593
Hill, W.	Knoxville	(118) 212	(119) 237	(120) 221	670
Hill, W.	Knoxville	(121) 220	(122) 226	(123) 222	668
McFarlane, A. S.	Kilkenny	(124) 200	(125) *	(126) 144	344
Hutchinson, A. S.	Athelstone	(127) *	(128) 244	(129) 232	476
Hutchinson, A. S.	Athelstone	(130) †	(131) 213	(132) 208	421
Gavin, C. G.	Salisbury	(133) 233	(134) 232	(135) 269	734
Gavin, C. G.	Salisbury	(136) 248	(137) 242	(138) 234	724
Thomas, C. R.	Hectorville	(139) 225	(140) 210	(141) 167	602

Egg Laying Competition.—Section 1.—White Leghorns, &c.—continued.

Competitors.	Address.	Score for Month ending March 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Compton, R. C.	Woodeforde	(142) 192	(143) 220	(144) 208	620
Connor, D. C.	Gawler	(145) 107	(146) †	(147) 161	268
Robinson, A. E.	Hectorville	(148) 276	(149) †	(150) 246	522
Vann, R. S.	New Hindmarsh ...	(151) 189	(152) 166	(153) 140	495
McLean, J. G.	Black Forest	(154) 138	(155) 162	(156) 149	449
Fidge, H.	Clarence Park	(157) 194	(158) 176	(159) *	370
Fidge, H.	Clarence Park	(160) 154	(161) 192	(162) 224	570
Tolhurst, A. E.	Torrens Park	(163) 156	(164) 148	(165) *	304
Tolhurst, A. E.	Torrens Park	(166) 167	(167) 171	(168) 138	476
Monkhouse, A. J.	Woodside	(169) 185	(170) 237	(171) *	422
Monkhouse, A. J.	Woodside	(172) *	(173) *	(174) 228	228
Monkhouse, A. J.	Woodside	(175) 224	(176) *	(177) *	224
Monkhouse, A. J.	Woodside	(178) *	(179) *	(180) 178	178
Sage, H. R.	Nuricootpa	(181) 151	(182) *	(183) 179	330
Mitchell, W. J.	Woodside	(184) 238	(185) *	(186) 262	500
George, L. E.	Redfern	(187) 189	(188) 247	(189) 166	602
George, L. E.	Redfern	(190) 233	(191) 234	(192) *	467
George, L. E.	Redfern	(193) 182	(194) 214	(195) 222	618
George, L. E.	Redfern	(196) 205	(197) 242	(198) 224	671
Aird, J. R., & Son	Kilkenny	(199) 186	(200) 234	(201) *	420
Aird, J. R., & Son	Kilkenny	(202) 188	(203) 205	(204) 195	588
Gameau, V. F.	Woodville	(205) 182	(206) 179	(207) 203	564
Totals.....	.....	11,708	10,955	10,473	33,136

Section 3.—Black Orpingtons.

Competitors.	Address.	Score for Month ending March 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Aird, J. R., & Son	Kilkenny	(208) 168	(209) 108	(210) †	276
Aird, J. R., & Son	Kilkenny	(211) 169	(212) 185	(213) *	354
Williams, W. R.	Frewville	(214) 212	(215) 245	(216) 197	654
Williams, W. R.	Frewville	(217) †	(218) *	(219) 199	199
Gurr, A. and H.	Scott's Creek	(220) *	(221) *	(222) *	—
Andrewartha, A.	Underdale	(223) *	(224) 213	(225) 239	452
McFarlane, A. S.	Kilkenny	(226) 235	(227) 203	(228) 157	595
Connor, D. C.	Gawler	(229) *	(230) 210	(231) *	210
Gillick, W. J.	New Hindmarsh ...	(232) 104	(233) *	(234) *	104
Osborn, E. L.	Camden.....	(235) 151	(236) 245	(237) 215	611
Totals.....	.....	1,039	1,409	1,007	3,455

Section 4.—Rhode Island Reds.

Competitors.	Address.	Score for Month ending March 31st, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Gameau, V. F.	Woodville	(238) 159	(239) 191	(240) 141	491
Fidge, H.	Clarence Park	(241) 179	(242) 231	(243) 104	514
Totals.....	.....	338	422	245	1,005

* Disqualified, Rule 12, underweight eggs.

† Dead.

DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported on April 1st, 1931.

BUTTER.—The market throughout March continued fairly steady, only slight fluctuations occurring during some weeks. This was due to the London market keeping fairly steady, and although South Australia exported very little during the month, values were largely influenced by overseas rates in sympathy with the movements in the various States of the Commonwealth. Production is now rapidly declining, and must continue to do so until the break of the season and the growth of the pastures. Consumption kept up fairly well considering the lower purchasing power of the people, and at the close of the month prices were as follow:—Choicest creamery fresh butter, in bulk, 1s. 7½d. Prints and delivery, extra. Second and third grades, 1s. 5½d. (These prices are subject to the stabilisation levies.) Best separators, 1s. 4d. to 1s. 5d. Well-conditioned store and collectors', 1s. 1d. to 1s. 2d.

EGGS.—There were sharp rises in the values of eggs during the last week or two of March, due to the rapid decrease in production coupled with the fact that the Lenten demand was very much stronger. The quality of the eggs also shows an improvement owing to the cooler weather conditions, and ready clearances were effected of all lots. Ordinary country eggs, fresh hen, 11d. per dozen; duck, 1s. per dozen; selected, tested, and infertile, higher.

CHEESE.—Moderate demand continued for new cheese, although there was better call for semi-matured and matured lines. Local traders operated well, but Western Australian buyers of new cheese transferred their buying to Queensland brands to some extent, because of the lower quotations offering. New makes, large to loaf, 7½d. to 8½d. per lb.; semi-matured and matured, 11d. to 1s. per lb.

ALMONDS.—Heavy quantities of almonds were again marketed throughout the month, and alarm was felt in some directions over the projected removal of duty on kernels. This alarm, however, was somewhat premature, as later information revealed that the duty was only to be removed under certain conditions and on specific lines for manufacturing purposes. Brandis, 6d. to 6½d.; mixed softshells, 5d. to 5½d.; hardshells, 3d. to 3½d.; kernels, 1s. 3d. to 1s. 4d. per lb.

HONEY.—There was an improved demand for all grades of honey during the month, but more particularly for prime, clear extracted, new season's. Quite a lot of the honey was not up to the standard of choicest, this being due to the poorer flowering season in many districts. Prime, clear extracted, in liquid condition, 3½d. to 3½d. per lb.; best quality candied lots, 2½d. to 3½d. per lb.; second grade, 1½d. to 2d. per lb.

BEESWAX met with moderate demand, with ample stocks at all times offering. Rates nominally 1s. 3d. to 1s. 4d. per lb., according to sample.

BACON.—As usual with the nearer approach of winter conditions, the demand for bacon improved, and although regular heavy consignments were received from the various factories the stocks were cleared from day to day. There was a slight easing in rates for some cuts. The sale for hams showed a falling away at the beginning of the month, but with the nearer approach of Easter a better call was experienced from the ham shop and cafe proprietors. Best local sides, 9½d. to 10d.; best local factory-cured middles, 9d. to 9½d.; large, 8½d.; local rolls, 8d. to 8½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 2d.; local hams, 1s. to 1s. 1d.; cooked, 1s. 3d.; "Sugar Cane" brand lard, in packets, 11d., in bulk, 10d. per lb.; local prints, 9d. per lb.

LIVE POULTRY.—Increasing supplies of live poultry were received for each auction sale as Easter drew nearer, and almost record quantities were catalogued. The demand, however, was maintained better than might have been expected, and although prices were lower than for several years past, this was anticipated because of the general lower trend of all commodities. Prime roosters, 3s. to 4s. 3d.; nice-conditioned cockerels, 2s. 3d. to 2s. 10d.; fair-conditioned cockerels, 1s. 8d. to 2s. 2d.; chickens, lower; heavyweight hens, 2s. 8d. to 3s. 7d.; medium hens, 2s. to 2s. 6d.; light hens, 1s. 6d. to 1s. 11d.; couple of pens of weedy sorts, lower. Geese, 2s. 9d. to 4s.; prime young Muscovy drakes, 3s. to 4s.; Muscovy ducks, 2s. to 2s. 9d.; ordinary ducks, 1s. 6d. to 1s. 11d.; ducklings, lower. Turkeys, good to prime condition, 7d. to 9d. per lb. live weight; turkeys, fair condition, 5½d. to 6½d. per lb. live weight; turkeys, fattening sorts, lower. Pigeons, 3½d. to 4½d. each.

POTATOES.—Local, 5s. to 5s. 6d. per cwt.

ONIONS.—Brown, 5s. 6d. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of March, 1931, also the average precipitation to the end of March, and the average annual rainfall.

Station.	For Mar. 1931.	To end Mar.	Av'ge to end Mar.	Av'ge Annual Rain-fall.	Station.	For Mar. 1931.	To end Mar.	Av'ge to end Mar.	Av'ge Annual Rain-fall.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta	0.33	0.33	1.64	4.72	Brinkworth	0.85	1.49	1.92	15.85
Marree	1.02	1.06	1.44	5.86	Blyth	1.11	1.92	2.01	16.86
Farina	0.70	0.75	1.73	6.46	Clare	1.44	2.20	2.70	24.61
Copley	0.52	0.55	1.83	7.93	Mintaro	1.51	2.04	2.27	23.43
Beltana	0.79	0.83	2.07	8.59	Watervale	2.05	2.93	2.80	27.10
Blinman	1.03	1.10	2.49	12.02	Auburn	1.56	2.03	2.89	24.08
Hookina	1.90	1.99	1.63	11.51	Hoyleton	1.05	1.40	2.06	17.44
Hawker	1.23	1.37	1.76	12.28	Balaklava	0.77	1.35	1.96	15.61
Wilson	1.21	1.31	1.80	11.84	Port Wakefield ..	0.64	1.48	2.13	13.04
Gordon	1.27	1.40	2.16	10.73	Terowie	0.49	0.93	2.16	13.47
Quorn	0.95	1.18	1.83	13.42	Yarcowie	0.53	0.96	2.18	13.72
Port Augusta	1.28	1.63	1.73	9.43	Hallett	0.75	1.19	2.04	16.47
Bruce	1.07	1.32	1.72	9.94	Mount Bryan ..	0.73	0.94	2.05	16.79
Hammond	1.16	1.45	1.89	11.41	Koorunga	1.03	1.41	2.33	17.96
Wilmington	0.93	1.31	2.19	17.63	Farrell's Flat ..	0.90	1.38	2.13	18.75
Willowie	0.83	1.02	1.90	12.11	WEST OF MURRAY RANGE.				
Melrose	1.42	1.65	3.08	23.01	Manoora	0.83	1.25	2.05	18.94
Booleroo Centre...	0.86	1.05	2.03	15.26	Saddleworth	1.01	1.47	2.40	19.60
Port Germein	0.92	1.17	1.83	12.47	Marrabel	1.13	1.48	2.17	19.87
Wirrabara	0.71	0.96	2.29	19.34	Riverton	1.10	1.42	2.43	20.81
Appila	0.65	0.83	2.19	14.69	Tarlee	1.14	1.52	2.19	18.13
Craddock	1.18	1.26	1.82	10.87	Stockport	1.33	1.89	2.11	16.81
Carrieton	0.93	1.09	1.94	12.40	Hamley Bridge ..	1.18	1.58	2.18	16.60
Johnburg	0.81	0.95	1.71	10.64	Kapunda	1.05	1.49	2.52	19.85
Eurelia	0.95	1.07	2.05	13.06	Freeling	1.02	1.58	2.23	17.96
Orroroo	0.68	0.89	2.27	13.28	Greenock	1.30	1.88	2.43	21.68
Neckara	0.51	0.61	2.40	11.16	Truro	0.81	1.13	2.35	20.09
Black Rock	0.46	0.64	2.04	12.50	Stockwell	0.89	1.27	2.29	20.18
Oodlawirra	0.74	0.91	—	—	Nuriootpa	1.19	1.69	2.34	20.65
Peterborough	0.70	1.07	2.16	13.30	Angaston	1.06	1.57	2.49	22.49
Yongala	0.69	1.14	2.01	14.46	Tanunda	0.88	1.53	2.53	22.12
NORTH-EAST.					Lyndoch	0.87	1.55	2.30	23.58
Yunta	0.70	1.03	1.82	8.46	Williamstown	1.07	1.80	2.59	27.71
Waukaringa	0.80	0.85	1.63	8.06	ADELAIDE PLAINS.				
Mannahill	0.44	0.44	1.92	8.31	Owen	1.08	1.57	1.76	13.91
Cockburn	0.81	0.92	1.75	7.93	Mallala	0.77	1.36	2.09	16.67
Broken Hill, N.S.W.	1.23	1.28	2.21	9.61	Roseworthy	0.89	1.50	2.10	17.38
LOWER NORTH.					Gawler	0.79	1.53	2.33	19.06
Port Pirie	1.10	1.25	1.93	13.25	Two Wells	0.89	1.61	1.98	15.81
Port Broughton ..	0.58	0.86	1.73	14.02	Virginia	1.13	1.81	2.13	17.23
Bute	0.45	0.65	1.75	15.48	Smithfield	1.04	1.82	2.20	17.51
Laura	0.67	1.01	2.23	18.11	Salisbury	0.88	1.55	2.29	18.60
Caltowie	0.70	0.96	2.19	16.85	Adelaide	1.32	2.26	2.46	21.12
Jamestown	0.67	0.88	2.18	17.84	Glen Osmond ..	1.73	2.49	2.64	26.06
Gladstone	0.61	0.90	1.99	16.40	Magill	1.52	2.33	2.81	25.61
Crystal Brook	0.78	1.01	1.95	15.87	MOUNT LOFTY RANGES.				
Georgetown	0.85	1.10	2.21	18.47	Tentree Gully ...	1.45	2.24	2.96	27.53
Narridy	0.61	0.80	1.97	15.23	Stirling West ..	3.20	5.20	4.49	46.90
Redbill	0.66	1.03	1.90	16.63	Uraidia	2.25	3.67	4.24	44.11
Spalding	0.66	1.04	2.21	19.34	Clarendon	1.96	2.91	3.46	32.91
Gulnare	0.96	1.39	2.17	18.74	Morphett Vale ..	1.64	2.20	2.61	22.69
Yacka	0.85	1.16	1.88	15.35	Noarlunga	1.45	1.66	2.32	20.40
Koolunga	0.80	1.34	1.89	15.52	Willunga	1.51	1.82	2.82	26.02
Snowtown	0.47	0.98	1.85	15.70	Aldinga	1.21	1.48	2.35	20.25

RAINFALL—continued.

Station.	For Mar. 1931.	To end Mar.	Av'ge to end Mar.	Av'ge Annual Rain-fall.	Station.	For Mar. 1931.	To end Mar.	Av'ge to end Mar.	Av'ge Annual Rain-fall.
MOUNT LOFTY RANGES—contd.					WEST OF SPENCER'S GULF—contd.				
Myponga.....	1.57	2.12	2.85	29.14	Rudall.....	0.50	1.29	1.67	*12.07
Normanville.....	1.24	1.43	2.17	20.73	Cleve.....	1.17	2.52	1.94	14.61
Yankalilla.....	1.28	1.46	2.57	22.95	Cowell.....	0.74	1.07	1.87	11.16
Mount Pleasant..	1.08	2.13	2.72	27.29	Miltalie.....	1.25	2.37	2.12	13.59
Birdwood.....	1.02	1.87	2.82	29.28	Darke's Peak..	0.98	1.53	1.83	14.98
Gumeracha.....	1.43	2.60	3.19	33.45	Kimba.....	0.66	0.78	1.85	*11.50
Millbrook Reservoir	1.53	2.56	3.21	35.55					
Tweedvale.....	1.48	2.48	3.14	35.96					
Woodside.....	1.15	2.33	3.07	32.38					
Ambleside.....	1.32	2.75	3.33	35.02					
Nairne.....	1.05	2.63	3.14	28.22					
Mount Barker....	1.39	3.25	3.32	31.71					
Echunga.....	1.22	2.45	3.43	33.29					
Macclesfield.....	1.28	3.51	3.21	30.62					
Meadows.....	1.39	2.74	3.71	36.34					
Strathalbyn.....	0.93	2.17	2.48	19.43					
MURRAY FLATS AND VALLEY.					YORKE PENINSULA.				
Meningie.....	0.91	1.31	2.14	18.46	Walleroo.....	0.83	1.28	1.83	13.94
Milang.....	0.68	1.27	2.00	15.05	Kadina.....	0.74	1.12	1.88	15.71
Langhorne's Creek	0.72	1.57	1.99	14.80	Moonta.....	0.67	1.06	1.89	15.10
Wellington.....	1.00	2.18	2.18	14.64	Paskeville.....	0.67	0.97	1.72	15.64
Tailem Bend.....	1.45	3.24	2.25	14.66	Maitland.....	0.99	1.63	2.12	19.97
Murray Bridge....	0.70	1.62	2.07	13.76	Ardrossan.....	0.53	1.14	1.72	14.00
Callington.....	0.59	1.54	2.10	15.31	Port Victoria..	0.58	1.23	1.62	15.44
Mannum.....	0.51	1.35	1.85	11.53	Curramulka...	1.21	1.76	1.98	17.92
Palmer.....	0.58	1.26	2.05	15.55	Minlaton.....	0.76	1.22	1.85	17.90
Sedan.....	0.43	0.81	1.82	12.16	Port Vincent...	0.58	1.14	1.70	14.56
Swan Reach.....	0.39	0.57	1.89	10.65	Brentwood.....	0.83	1.08	1.66	15.52
Blanchetown.....	0.45	0.76	2.06	11.14	Stansbury.....	0.85	1.34	1.85	16.89
Eudunda.....	0.65	1.15	2.16	17.13	Warooka.....	0.58	0.83	1.66	17.60
Sutherlands.....	0.37	0.74	1.54	10.79	Yorketown.....	1.01	1.28	1.72	16.98
Morgan.....	0.37	0.65	1.62	9.17	Edithburgh....	1.12	1.36	1.86	16.44
Waikerie.....	0.40	0.69	1.89	9.61					
Overland Corner..	0.41	0.60	1.98	10.50					
Loxton.....	0.69	1.02	2.40	11.60					
Renmark.....	0.59	0.78	1.95	10.52					
WEST OF SPENCER'S GULF.					SOUTH AND SOUTH-EAST.				
Eucula.....	2.25	2.42	2.14	*9.96	Cape Borda....	1.08	1.61	2.10	24.76
Nullarbor.....	2.85	2.90	1.51	*8.62	Kingscote.....	1.04	1.16	1.85	19.05
Fowler's Bay.....	3.16	3.68	1.32	11.76	Penneshaw.....	2.60	3.14	1.87	18.65
Penong.....	3.36	3.53	1.51	11.94	Victor Harbor..	1.50	2.03	2.43	21.33
Koonibba.....	3.66	4.11	1.59	*11.64	Port Elliot....	1.00	1.50	2.40	20.02
Denial Bay.....	3.15	3.15	1.40	*11.31	Goolwa.....	0.78	1.28	2.32	17.87
Ceduna.....	3.10	3.20	1.20	9.82	Copeville.....	0.89	1.38	1.84	11.58
Smoky Bay.....	1.28	1.56	1.07	10.44	Meribah.....	0.53	0.70	1.94	*11.34
Wirrulla.....	1.69	1.75	—	—	Alawoona.....	0.52	0.92	1.59	*9.98
Streaky Bay.....	0.63	1.00	1.44	14.91	Mindarie.....	0.56	0.74	1.61	11.88
Chandada.....	0.85	1.09	—	—	Sandalwood....	0.76	1.37	1.98	13.67
Minnipa.....	1.00	1.20	1.93	13.73	Karoonda.....	1.26	2.05	1.91	14.37
Kyancutta.....	0.63	1.03	—	—	Pinnaroo.....	0.86	1.35	2.36	14.70
Talia.....	0.37	0.85	1.18	14.76	Parilla.....	0.83	1.53	1.82	13.95
Port Elliston....	1.10	1.69	1.33	16.47	Lameroo.....	0.78	1.43	2.15	16.19
Yeeleanna.....	0.42	0.64	1.25	16.03	Parrakie.....	0.75	1.30	1.99	14.52
Cummins.....	0.38	0.56	1.33	17.77	Geranium.....	0.98	1.44	2.10	16.49
Port Lincoln....	0.77	0.87	1.88	19.45	Peake.....	0.96	1.46	2.44	16.30
Tumby.....	0.44	0.92	1.51	14.14	Cooke's Plains..	1.01	1.64	2.15	15.47
Ungarra.....	0.87	1.51	1.70	16.83	Coomandook....	0.98	1.55	2.14	17.34
Carrow.....	0.72	1.46	1.67	13.38	Coonalpyn.....	0.80	1.47	2.16	17.51
Arno Bay.....	0.84	1.63	1.77	12.46	Tintinara.....	1.12	1.50	2.20	18.81
					Keith.....	0.96	1.81	2.14	17.93
					Bordertown....	0.82	1.11	2.28	19.35
					Wolseley.....	0.84	1.12	2.10	18.41
					Frances.....	0.91	1.85	2.35	19.94
					Naracoorte....	1.15	2.57	2.55	22.58
					Penola.....	1.18	3.66	3.11	26.15
					Lucindale.....	1.05	2.86	2.34	23.07
					Kingston.....	1.09	2.40	2.42	24.37
					Robe.....	1.34	2.36	2.54	24.61
					Beachport.....	1.03	2.48	2.96	26.97
					Millicent.....	1.46	3.27	3.29	29.79
					Kalangadoo....	1.41	4.19	3.64	32.34
					Mount Gambier	1.40	3.46	3.81	30.74

* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucula (1), Wirrulla (1).

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		April.	May.			April.	May.
Alawoona	977	—	—	Budunda	972	6	4
Aldinga	•	—	—	Eurella	970	11	9
Allandale East	969	—	1	Eurella Women's	965	1	6
Alma	•	—	—	Everard East	†	—	—
Amyton	•	—	—	Farrell's Flat	•	24	29
Angaston	•	—	—	Finniss	•	—	—
Appila	•	—	—	Gawler River	•	—	—
Appila-Yarrowie	†	—	1	Georgetown	•	—	—
Archurton	974	—	—	Geranium	•	25	2
Ashbourne	†	1 & 29	—	Gladstone	972	—	30
Auburn	•	—	—	Gladstone Women's	965	10	1
Auburn Women's	965	24	29	Glencoe	•	14	8
Balakiava	•	27	25	Glossop	•	—	12
Balhannah	†	—	—	Goode	†	1	—
Barmora	•	—	—	Goode Women's	966	1	6
Beetaloo Valley	971	27	—	Greenock	•	6	6
Belalie North	971	—	—	Green Patch	975	2 & 30	4
Belalie Women's	•	—	—	Gulnare	•	—	—
Berri	•	1 & 29	—	Gumeracha	984	6	—
Big Swamp	•	—	—	Halldon	•	—	4
Blackheath	984	9	—	Hanson	•	—	—
Black Rock	†	28	7	Hartley	984	1 & 29	—
Black Springs	†	28	26	Hawker	•	7	27
Blackwood	984	13	—	Hookina	•	—	5
Block E	•	—	—	Hoyleton	•	20	—
Blyth	†	17	15	Inman Valley	985	16	18
Booleeroo Centre	•	—	1	Ironbank	•	—	21
Booigun	†	—	—	Jamestown	•	15	—
Boora Plains	•	2	7	Kalangadoo Women's	967	11	20
Borrika	•	—	—	Kalangadoo	•	14	9
Bowhill	†	2	7	Kalyan	978	15	12
Brentwood	•	—	—	Kangarilla	†	—	20
Brinkley	977	1 & 29	—	Kangarilla Women's	•	16	—
Brinkworth	972	27	—	Kanmantoo	•	—	21
Brownlow	•	—	—	Kanndi	•	—	—
Buchanan	•	—	—	Kapinnie	976	—	—
Bugle	•	14	12	Kapunda	•	10	—
Bundaleer Springs	•	—	2	Karcultaby	•	—	8
Bunora	•	16	21	Karoonda	•	1 & 29	—
Bute	•	—	—	Keith	•	2 & 30	—
Butler	•	—	—	Kelly	•	—	—
Calca	•	—	—	Ki Ki	•	—	2
Cadell	•	7	—	Kilkerran	974	—	—
Caliph	•	—	5	Kongorong	•	27	5
Caltowie	•	—	—	Koolunga	•	—	—
Canoowie Belt	•	—	—	Koonibba	•	2 & 30	—
Caralue	975	1 & 29	—	Koonunga	•	—	—
Carrow	•	1 & 29	—	Kopplo	•	27	—
Chandada	•	—	—	Kringin	•	6	—
Charrra	•	—	—	Kulkawitra	•	14	4
Cherry Gardens	984	—	2 & 30	Kyancutta	•	7	12
Clanfield	978	4	—	Kybybolite	†	7	55
Clare	•	7	5	Lameroo	978	—	2
Clarendon	•	27	—	Langhorne's Creek	•	1 & 29	—
Cleve	•	2	7	Laura	†	4	2
Cobdogla	•	—	—	Laura Bay	†	14	12
Colile	•	1	6	Lenswood and Forest Range	•	—	—
Colton	•	—	—	Light's Pass	972	—	—
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Coonalbyn	•	—	—	Lone Gum and Monash	•	1 & 29	—
Coonawarra	†	2 & 30	—	Lone Pine	•	—	—
Coorabelle	•	—	—	Longwood	985	—	—
Copeville	977	—	—	Lowbank	•	1 & 29	—
Coulta	•	—	—	Loxton	•	10	8
Cradoek	•	10	8	Lucindale	•	28	—
Cummins	•	—	—	Lyndoch	•	—	—
Cungena	•	—	—	McLaren Flat	•	—	—
Currency Creek	•	6	4	MacGillivray	•	28	—
Cygnet River	•	—	—	Mallala	•	20	18
Darke's Peak	•	—	—	Maltes	•	2 & 30	—
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Meribah	*	13	11	Rosedale	†	7	—
Milang	*	11	9	Roseworthy	974	—	—
Milendilla	980	2 & 30	—	Rosy Pine	*	—	—
Millicent	*	24	29	Rudall	*	28	—
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Miltalle	*	4	2	Saddleworth Women's	*	7	5
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Modbury	*	—	—	Sandalwood	*	—	—
Monarto South	980	—	—	Scott's Bottom	*	—	2
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Moorlands	981	1 & 29	—	Smoky Bay	*	4	2
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				Yurco	*	—	—

No report received during the month of March.

† Held over.

■ In recess.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS. WOMEN'S BRANCHES.

BREADMAKING.

[A paper read by MRS. W. VARCOE (*Millicent*) at the Kalangadoo Conference.]

Bread stands at the head of all foods. It has been correctly termed "The Staff of Life." Wheat, from which bread is mostly made, contains more nearly than any other one article all the necessary food elements required to sustain the human system, and so forms nearly a perfect food. Home made bread, when properly prepared, is much to be preferred to baker's bread. It is also much cheaper and keeps fresh longer. Day-old baker's bread is as dry as week-old home made (that has not been overcooked). Every housewife ought to know how to make good bread. Three essentials to good breadmaking are—good yeast, good flour, proper attention and baking. Good flour is of a creamy white color, and when a pinch is held between finger and thumb, and well rubbed, it should remain separate in grain and not adhere together or become sticky, which it will do if at all damp. You cannot make good bread from damp flour. Australian flour is acknowledged to be the best type of flour the world produces. Wheat grown in the Northern districts is much superior to wheat grown in the lower South-East, as our climate is not suitable for growing wheat for flour. Owing to our cool summers, wheat ripens slowly, is browner, and the grain has a thicker skin. Flour made from it has a darker color and is moister, consequently bread made from it is not so white or light as that which is made from flour produced in the drier, warmer parts of Australia. *To Make Yeast.*—Take 1 tablespoonful hops, 1 tablespoonful salt, 1 tablespoonful sugar, and 2 pints of boiling water. Boil all together for 2 minutes. Grate 2 medium-sized potatoes in a basin. Mix in 1 tablespoonful of flour. Strain yeast, and, while boiling, pour it into the basin of flour and potatoes, stirring all the time. Stand aside until cold. Then half fill the bottles. Cork tightly and tie down corks. Stand in a warm place until it works, when it is fit to use. It will keep good for a fortnight at the least, and I have had it keep for more than a month. *To Make Bread.*—Take 6 heaped cupfuls of flour, or 2 cups of flour and 4 cups of whole wheatmeal, 1 level tablespoonful of salt, 2 cupfuls of yeast. Put the flour in a deep pan, make a well in the centre, stir in 1 pint of water (as hot as you can bear your hand in). Stir well together from the centre until a thick paste is formed. Then add the yeast, mix all together until a large loaf is formed, add a little more flour if you find dough is too soft. Leave in pan, cover with a cloth, wrap a blanket round and leave set out until morning, when it should be twice its original size. Prepare the tins by greasing them inside. Weigh the dough—about 2lbs. 2ozs. to make a 2lb. loaf. Knead and put in tins, set in a warm place near the stove. When it has again risen to twice its original size, bake in a moderately hot oven for one hour. Pastry made from yeast dough is very nice. Roll out a pound of dough (when fit to put in baking tins). Take 10ozs. dripping or lard, spread some over the dough. Fold over in three and roll out again. Repeat spreading the shortening, folding and rolling about six times. Then use for covering meat or fruit pies. It is delicious when eaten hot. *To Make Brounie.*—Take about 2lbs. of dough after it has risen. Spread it out on the board or mix in a pan. Mix into it 1 cup of currants, raisins, or any fruit liked, 1 small cup of sugar, a little more than half a cup of butter or dripping, and a little cut up lemon or orange peel. Knead all together well, adding a little more flour. Put in tins the same as bread. Stand aside to rise, and bake the same as bread in an oven not quite so hot as for bread. This is a good recipe for yeast buns—½lb. butter, 1 pint milk (hot). Dissolve butter in milk, ½lb. sugar, 4 eggs (well beaten), 1 large cup of yeast, currants, raisins, dates, and peel to taste. Sufficient flour to make a rather soft dough. Mix all ingredients together, let dough rise all night, make into buns in the morning, and bake in a quick oven. Brush over with sugar and milk about five minutes before taken out of oven. This mixture with a softer dough makes a rich German cake.

AUBURN (Average annual rainfall, 24.08in.).

February 27th.—Present: 12 members.

SAUCES AND PICKLES.—Mrs. Morcom gave the following recipes:—When making tomato sauce always select sound, ripe fruit, the overripe fruit is too full of juice, and the sauce will be too thin unless the quantity of vinegar is reduced. The following is a reliable recipe:—12lbs. tomatoes, 3 pints vinegar, 4ozs. shallots, 4ozs. garlic (or onions), 2ozs. white pepper, 8ozs. salt, $\frac{1}{2}$ oz. cloves, $\frac{1}{2}$ oz. ground ginger, $\frac{1}{2}$ oz. mace, $\frac{1}{2}$ oz. ground allspice. Cut tomatoes and onions in pieces, boil to pulp with vinegar and spices, then strain. Add 1lb. sugar and boil about 2 hours. *Pickled Figs.*—4qts. vinegar, $\frac{1}{2}$ lb. white sugar, $\frac{1}{2}$ lb. salt, $\frac{1}{2}$ oz. pepper corns, 2ozs. each allspice, cloves, and ginger. Soak ripe figs in the liquid for three days, then pour it off and boil. Add the boiling liquid to the figs and allow the pickle to stand one month before using. *Mustard Pickles (Cauliflower).*—6lbs. cauliflower, 2 cups sugar, 1 teaspoon mustard, 2 teaspoons turmeric, 1 teaspoon curry powder, 1 tablespoon salt, $\frac{1}{2}$ cup flour, $\frac{1}{2}$ oz. cloves, 2qts. vinegar, $\frac{1}{2}$ oz. whole allspice. Method: Cut up cauliflower over night and stand in salt water. Next day strain and boil until tender, in fresh water. Drain well and add to the other ingredients. Mix mustard, &c., to a smooth paste and add to boiling vinegar. Boil for 10 minutes, add cauliflower and boil all together until pickle has gone right through vegetable. (Secretary, Miss L. Dennison.)

EURELIA (Average annual rainfall, 13.06in.).

September 3rd.—Present: 16 members and one visitor.

Recipes for cold meats were read and discussed by members. The following recipes were submitted:—*How to Make Hot Dishes from Camp Pie Meat.*—No. 1—Put all into a saucepan with a pint of boiling water, then thicken with flour, and serve with mashed potatoes; it also makes splendid sausage rolls. No. 2—Slice pie in $\frac{1}{4}$ in. slices; make a batter of two eggs, a little milk, a cupful of self-raising flour, and a pinch of salt; dip the slices of camp pie well into the batter, then fry in dripping or lard till nice and brown. This is a good dish to serve with chip potatoes. No. 3—One tin (large) of camp pie, one onion, three potatoes; put through the mincer with onion; cook potatoes, mash them with a little butter and milk, add the meat; mix well together; put in a pie dish, lightly greased; bake in a fairly hot oven one hour. *An Easy Way to use up Cold Mutton.* *Mutton and Potato Pie.*—Two pounds of cold mutton, 2lbs. of potatoes, two onions, salt, and pepper. Cut the meat into small, thin slices, partly boil again. Put on the bottom of pie dish a layer of potatoes, then a layer of meat, and a few slices of onion, and season with salt and pepper. Repeat until all the ingredients are used, the top layer being potato. Pour the gravy in which the meat was boiled (about $\frac{1}{2}$ pint). Cover with a greased paper and bake about one hour. A quarter of an hour before serving, remove the paper to allow the potatoes to brown. *Quarter of an Hour Stew.*—Ingredients, 1lb. to 1 $\frac{1}{2}$ lbs. cooked meat, stock or water, pepper and salt, two large onions. Place the onions in the frying pan and cook till brown. Pour off the fat used for frying onions and add stock or water. Let these boil for a few minutes, add the meat, finely chopped, and let all simmer for about 10 to 15 minutes to taste. Add thickening of flour and water. Serve when quite hot. This stew is delicious and uses up any odd pieces of cooked meat unsuitable to put on the table. *Cold Meat with Macaroni.*—One pound of any cold meat (minced), one cup bread crumbs, two eggs, little milk, salt and pepper. Mix well together; boil $\frac{1}{2}$ lb. of macaroni for 20 minutes in salted water, then strain. Butter a bowl, line it with macaroni, then put the meat mixture in. Cover with the rest of the macaroni. Cover bowl with butter paper and steam one hour. Serve with parsley sauce. *Savoury Pie.*—One pound cold roast beef, four tomatoes, two onions, 2ozs. grated cheese, butter, salt and pepper, and bread crumbs. Chop meat finely, melt butter, and fry onion; add meat, salt and pepper, and sliced tomatoes; simmer gently for 15 minutes. Grease a pie dish and pour into it a layer of mixture and sprinkle with bread crumbs and cheese. Add tomatoes, then rest of meat, &c. Bake in moderate oven 20 minutes. *Rissoles.*—One pound of any cold cooked meat, one slice of bread, one large onion, one egg, seasoning, pepper, salt, and flour. Mince the meat, bread, and onion. Sprinkle with flour, add pepper, salt, and seasoning. Beat the egg and mix all together. Form into patties, dip in egg and bread crumbs, and fry for about 10 minutes. (Secretary, Mrs. E. Wall.)

GLADSTONE WOMEN'S (Average annual rainfall, 16.40in.).

February 13th.—Present: 14 members.

HOW TO RUN A KITCHEN.—Mrs. G. Smallacombe read the following paper, which was also read at the Wirrabara Conference:—Make a kitchen attractive; because it is a kitchen it should not be neglected, for it is the most important room of the house. The two most important things in running a kitchen are cleanliness and economy.

The kitchen is the central point of the housewife's energies, and if forethought is used in the kitchen outfit it will save much time and trouble. If cooking utensils and saucepans are hung or neatly arranged on shelves there is no losing a saucepan lid, or grovelling on the floor groping for a dish that has slipped right to the back of a wide shelf. Make sure everything you need is convenient. Have a towelrack or line handy, a slate or book with pencil attached ready to put down groceries as the tins and jars get low, in order not to miss anything next order day. Farmers usually get their supplies about twice a week, and if some article is missed it is of no use phoning the grocer to bring it around or even going to our neighbor to borrow. Have a place for everything and always keep it in its place, not in one cupboard or shelf to-day and another to-morrow. It saves a lot of time if plates and saucers are neatly packed in a Nile for each size, and basins, piedishes, &c., are better put away in sets instead of put in a cupboard anyhow, as is often the case, and then very often the one you want is at the back under something else, and by the time you have found it the time has gone in which the cake or pudding could have been half mixed. A good plan for cutlery if you use a drawer is to make apartments out of boxes—one for knives, one for prongs and dessert spoons, a smaller box for teaspoons. Have a string holder ready for pieces of string. String holders can easily be made in a novelty shape, making a kitchen ornament. Have a tidy place for all clean papers, also waste paper basket for scraps for fire lighters. On many farms meals are served in the kitchen, but that is no reason why the meal should not look just as attractive and tempting as in any dining room. A nice white tablecloth, a table centre, and a vase of flowers go a long way towards making the meal look dainty. Some people think that if the meals are eaten in the kitchen jam tins or bottles can be placed on the table, but that is a thing of the past, or it should be. Modern housekeeping demands that the strictest attention be paid to the selection of food and its use for meal preparation, simply because rising costs mean that the housekeeping purse is less and less elastic. Food that is purchased has to be used so that there is no waste whatsoever. Left-over foods which were in the past discarded or haphazardly used have now to be carefully conserved and fashioned into dishes which form principal courses at meal time. The careful housewife endeavors to plan two meals at once so that she can provide some, if not all, of the ingredients at one cooking. For instance, when cooking rice for serving with curry, rice pudding should be a suggestion for to-morrow's meal. Save all bread crusts and bake them, then mince or roll to crumbs ready for use. The crumbs will keep for months if put in glass bottles with airtight lids. *A Few Economical Recipes.—Eggless Pudding.*—Butter, size of an egg, 1 cup sugar, 2 cups boiling water, 2 cups flour, 1 teaspoon carb. soda, fruit to taste; steam three hours. *Jubilee Cake:* 1½ cups S.R. flour, 1 dessertspoon of butter, 1 tablespoon sugar, 1 cup sultanas, currants, and peel, 1 egg, ½ cup milk. Method—Mix dry ingredients together, add egg and milk. Bake ½ hour in moderate oven, while hot pour on icing mixed with milk. Sprinkle with cocoanut, serve with butter. *Chocolate Layer Cake:* 1 cup sugar, ½ cup butter, 2 eggs, ½ cup milk, 1½ cups S.R. flour, essence vanilla and cocoa to taste. When cold fill with vanilla filling and ice with chocolate icing. *Cooking Hints:* (1) Before turning a steam pudding out of a basin, leave it for a few minutes, and it will shrink. Loosen the sides carefully with a sharp knife, put the plate upside down over basin, give it a slight shake, and lift it carefully away. This is a sure way of serving a pudding. (2) When the oven is too hot for cakes the heat can easily be lowered by putting a basin of cold water in it. (3) If a little carbonate of soda is added to tart fruits when stewing less sugar is required. (4) It will be found that rice is the cleanest and best thing to clean vinegar bottles. Put a little rice in the bottle, add some clean water, and shake; then wash and rinse in usual way. (5) If enough water to cover the bottom of a saucepan is boiled in the saucepan before adding milk it will seldom burn. (Secretary, Miss J. Sargent.)

GOODE WOMEN'S.

February 4th.—Present: Seven members and three visitors.


TABLE SETTING.—Mrs. D. Fagan contributed the following paper and Mrs. Klau and Miss P. Linke gave a demonstration of table setting:—"There are a few general rules which apply equally to mansion and cottage. However simple may be the meal, and however coarse in texture the cloth, it should be clean, free from creases, and arranged smoothly with the centre fold forming a true line the whole length of the table. The knives should be clean, bright, and sharp, and the silver clean and well polished. After each meal all knives should be cleaned and made ready for use. All crumbs should be removed from the table with brush and crumb tray, and the cloth either left on the table, or folded on the table, instead of taking it off and shaking outside and then folded. With care, a cloth will be scarcely soiled at the end of a week's use. Tablecloths and table napkins should be of as good quality as means will afford, alike in design when possible. Table linen should be very lightly starched;

if made too stiff, the corners of the tablecloths, instead of falling in natural folds, stand out awkwardly, and the table napkins are unpleasant to use. When setting a table, a good rule is to allow about 2ft. for each person's accommodation. Where the table is large, a little more room does not matter, but on no account give less. It is usual to lay two large knives and forks, a fish knife and fork, and a soup spoon; other knives and forks are supplied with the plates for the different courses. The decoration of tables forms a wide field of work for artistic taste and skill. Young people should have their taste for arranging flowers encouraged and be allowed to assist in decorating the table. Care should be taken not to overload the table with flowers and ornaments. Where the means or the supply of flowers is limited, delicate ferns and other plants suitable for table use may be used, for they look, in many cases, as pretty as flowers, unless the latter be most tastefully arranged. Very often the effect is marred by too many colors being introduced. It is equally so by too many flowers being used. Each flower should have room to stand out, and each flower should be put in in the way it grows. If hanging ones be used, let them hang; if they naturally stand upright, let them be so placed to look natural. Glasses through which the stems of the flowers can be seen should be filled with water, but bowls or stands can be filled with moss or sand, in which it is far easier to arrange the flowers than in water. Table napkins can be folded into so many beautiful designs or shapes that anyone who has any taste can make a dinner table look wonderfully well." (Secretary, Mrs. A. Watson.)

KALANGADOO WOMEN'S (Average annual rainfall, 32.34in.).

February 14th.—Present: 15 members.

TANNING AND DYEING SHEEPSKINS.—Mrs. Dowdell read the following paper:—"Procure a skin which has just been removed from a sheep, cut off all very dirty parts, and if the wool is soiled and dusty wash in several lots of clear water. Get a large tub, bath, or small trough, warm about a kerosine tin of water, dissolve in this about 3ozs. of soap, and add enough cold water to cover the skin. Let the skin soak for 12 hours, rinse off the soapy water, then repeat the same process, and leave the skin again for 12 hours, giving it a stirring occasionally. Take care to rinse off all soapy water, using three or perhaps four lots of water; leave a while to drain. Melt 1lb. alum and 1lb. salt in a little water over the fire, add enough cold water to just cover the skin (about 1gall.); let the skin soak in this for 12 hours, continually stirring and rubbing in the mixture. See that the mixture gets to all parts on both sides of the skin. Then let the water drain out. *To Dye.*—Have ready two packets of dye, boiled and strained, then add enough water to cover the skin, getting the dye over the wool as evenly as possible. Leave in the dye for six hours, stirring occasionally, and leave to drain. Before the skin is dry spread on a table and rub into the back ½lb. alum



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and $\frac{1}{2}$ lb. saltpetre, well mixed together and broken into a powder. As the skin dries work it up with pumice stone or a piece of brick until the skin resembles soft leather. When thoroughly dry, comb out the wool with a steel comb." (Secretary, Miss A. Kennedy.)

MILLICENT WOMEN'S (Average annual rainfall, 29.70in.).

January 16th.—Present: Seven members.

APPLE JELLY.—Mrs. Cassels tabled the following recipe for apple jelly:—Take as many apples as required—windfalls will do, as they must be green—and small ones are the best. Place in a preserving pan with a few cloves, and add enough water to cover them. When boiled to a pulp—do not stir—strain through a jelly bag, and to every breakfast cup of juice add three-quarters of a cup of sugar. Boil briskly until it jellies, then pour into jars. Mrs. Altschwager remarked that when making jams or jellies it was an economical plan to save what was skimmed off and use it later for sweetening pies and puddings. Mrs. Varcoe said she seldom skimmed the jam. By adding a small quantity of glycerine or butter to the jam a few minutes before removing from the fire the froth was absorbed in the jam, and did not make it at all cloudy. If butter was used, all water should be well pressed out before it was put in the jam. Mrs. Altschwager read some recipes for casserole cooking, which interested those present. The Secretary read a brief report of the half-year's work.

YEAST.—At the meeting held on February 20th, which was attended by 10 members, a discussion took place on "Yeast." Mrs. Hart said it was better to scald the hops for yeast; boiling tended to make the yeast a dark color and brought out the bitterness of the hops. Mrs. Varcoe agreed, but preferred to boil it for about a minute; boiling for a longer period gave the yeast a bitter taste that was passed on to the bread. Yeast in which all the ingredients were cooked could be kept longer. (Secretary, Mrs. W. Varcoe.)

NELSHABY WOMEN'S.

January 29th.—Present: 10 members and visitors.

POULTRY ON THE FARM.—Mrs. R. Noble read the following paper, which was also contributed at the Wirrabara Conference:—Poultry may be made a valuable sideline on every farm, more or less depending on the time one has available for attending them. Without very much attention one may get returns, but with a moderate amount of attention and hard work one is sure of good returns (even if it does not rain much). It is better to have, say, 100 good laying hens, well looked after, than 200 more or less allowed to look after themselves. So far I have found 100 enough for myself to manage with the rest of my work, but that just depends on what one has to do and the help available. It is advisable to have as good a house as one is in a position to build (so far my hopes have not been realised), one that is easily cleaned with as little harbor for tick as possible. Used motor oil applied liberally to all perches, cracks in wood, &c., is good for keeping tick down. Always procure the best stock you can to start with, and try to improve; do not introduce all kinds of strains and fresh breeds. Leghorns are outstanding layers; Black Orpingtons have put up some good scores. Personally, I would like to test one against the other for eating food before discarding White Leghorns. A good cross should prove profitable for table birds. Layers and table poultry need different methods, and should be run on separate lines. Green feed must be fed liberally, especially through the summer. It makes healthy stock and good eggs. Good grain is necessary. Cut out the grain and you cut out the egg yield. Supply also plenty of shell grit, cracked bone, crockery, and charcoal. You must have good quality eggs to hatch strong chickens. Do not hatch late chickens. Early autumn and early spring are the best and most profitable. You must have young birds to lay well through the winter months. Sell off all hens after the second year, excepting any very persistent layers. These, perhaps, would be better to keep, and cull more heavily amongst the younger birds. If the young birds are looking miserable and you feel disgusted with them, try what a few feeds of chopped raw onions will do. There is much talk of poor farm eggs; that difficulty should be easily overcome by gathering and selling often, and most of all by producing only infertile eggs for market. But is the farmer always to blame? Eggs are often kept in the stores for a considerable time. Also, I made inquiries in Port Pirie if they could give a penny extra for fresh infertile eggs; the answer was, "Why, their customers would not give the extra," so conclude that farms cannot be so bad after all. Anyhow, it is up to us for the sake of the egg industry of Australia to see that ours are marketed infertile, fresh, and of good quality. (Secretary, Miss A. Lawrie.)

PARILLA WOMEN'S (Average annual rainfall, 13.70in.).

February 8th.—Present: 15 members.

PICKLES AND SAUCES.—The following recipes were brought forward:—*Mustard Pickles*—Ingredients—3 large cucumbers, 3 cauliflowers, 2lbs. onions, 2lbs. young beans, 1 cup of flour, $\frac{1}{2}$ cup mustard, 1 cup sugar, 1 tablespoonful turmeric, $\frac{3}{4}$ oz. cayenne pepper, 2qts. vinegar. Method—Cut the cauliflowers in small pieces. Cut the cucumbers in halves, scrape out the seeds, and cut in small pieces. Skin the beans and cut in pieces. Peel the onions and cut in pieces. Lay them in a strong brine of salt and water over night. Take out and drain, put all into a lined saucepan with boiling vinegar, then mix the other ingredients with a little cold vinegar, and mix with the cauliflower, &c. Boil for a few minutes. *Worcestershire Sauce*.—1gall. vinegar, 2 cups golden syrup, 3 cups plum jam, $\frac{1}{2}$ lb. garlic, 2ozs. cloves, 2ozs. whole spice, 2ozs. ground ginger, 1oz. cayenne pepper, 1 cup sugar. Boil for one and a half hours, then strain. (Secretary, Mrs. Welden.)

PARRAKIE (Average annual rainfall, 14.52in.).

February 25th.—Present. Nine members and seven visitors.

The meeting was held at the residence of Mrs. Threadgold. An interesting inspection was made of the flower and vegetable garden, and the poultry and cattle.

A previous meeting was held on January 27th, there being present 10 members and four visitors. Mrs. Ferne read a paper, "Discipline and Training of Children." Mrs. Hamilton gave several useful recipes. (Secretary, Mrs. M. Cabot.)

PINNAROO (Average annual rainfall, 14.70in.).

Meeting held February 6th. Present: Mrs. Fewings (Chair) and 11 members. Mrs. Sands read a paper, "How to Conduct a Meeting." (Secretary, Mrs. F. Atze.)

WILLIAMSTOWN (Average annual rainfall, 27.71in.).

Meeting held February 4th. Present: 10 members and visitors. Mrs. Hammatt read a paper, "Bread Making."

ODDS AND ENDS FOR THE HOUSEWIFE.—A further meeting was held on March 4th, when Mrs. Hamilton presented the following paper:—"In preparation for the jam-making season it is a good plan to save all clean pieces of white paper. These should be cut up into covers of the desired size. When the time comes to seal down the jam pots, prepare a small quantity of starch in the same way as one would for starching lace curtains. With a clean rag or a small brush smear over one side of each cover with the starch. Place two of these starched surfaces together and tie them on the jars as tightly as possible. If the paper is very thin three layers can be used. When dry the covers will be like strong parchment and the preserve will keep good for a long while. *Borax Secrets.*—The average housewife fails to realise the importance of borax, in spite of the fact that it is an invaluable aid in the majority of domestic duties. In cases where soda is too powerful, borax may be used to soften water with absolute safety. It should be added to hard water when washing silk and wool; it not only softens the water but improves the appearance of the fabric. When making starch, add half a teaspoonful of borax to each tablespoonful of starch. This will impart a gloss to the starched articles and make the iron run smoothly. Borax provides an excellent means of cleaning painted and varnished wood. For this purpose dissolve two teaspoonsful of borax in half a teacupful of boiling water, and add it to two quarts of cold water. To remove tea and coffee stains, apply a little borax to the affected part, and pour boiling water through the material. It may be necessary to repeat this operation several times. Add one tablespoonful of borax to the water when washing hair brushes. In this way every trace of grease or dirt will be removed. Borax is a disinfectant, and if dissolved in a little lukewarm water will make a good eye lotion or throat gargle. If windows are very dirty, wipe them first with a damp cloth. Then wipe again with a cloth dipped in methylated spirits. No polishing is required. (Secretary, Mrs. A. Cundy.)

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

Twelve members attended the meeting of October 31st, when a paper, "The Marketing System," was read by Mr. W. Laslett.

Nine members were present at the meeting held on November 25th. The subject, "Wool and Its Uses," was discussed. (Secretary, Mr. T. Earl.)

MUNDALLA (Average annual rainfall, 19.39in.).

Ten members and two visitors attended the meeting of October 8th, when reports on the Adelaide Congress were received.

Meeting held December 4th. Present: 12 members and three visitors. An instructive address, "Rust of Wheat," was delivered by Mr. L. Dinning. (Secretary, Mr. A. Ross.)

PENOLA (Average annual rainfall, 26.15in.).

Matters of timely and local interest were discussed at the meeting of the Branch held on October 6th, which was attended by seven members and visitors.

At a further meeting held on November 7th, attended by eight members, Mr. W. Clifford read a paper, "Preparing the Wool Clips." (Secretary, Mr. F. Hinze.)

TANTANOOLA.

October 4th.—Present: Eight members.

CLASSING THE CLIPS.—Mr. H. Hutchesson read the following paper:—To obtain the best price for his wool a grower must place it before the buyers in such a way that they can select their requirements and valueate correctly. This can only be done when buyers have even lines of wool before them. Mixing wools varying in quality and yields—sound and tender—can only result in loss to the grower, not only because it cannot be valueated correctly, but also because it reduces competition, which is a big factor in securing good prices. To-day it is possible to have wool re-classed in various wool stores. I do not consider this the ideal way because it is not possible to blend wool grown in various localities and this, and the fact of the wool having been pressed, does not lend to a good appearance. Although not ideal, it is far better than making a hash of classing in the shed. If it is possible to class well in the shed, this, in my opinion, is the best place. The belly should be dealt with as soon as possible after it has been placed aside by the shearer. All stains should be removed. Classing of bellies is sometimes warranted, the decision resting mainly on cost of work and probable gain in price. In a clip of only hundreds, I would not favor classing bellies, providing the quality is fairly even. It is not wise to mix Crossbreds and Merinos. After the fleece is removed from the board, the board should be well swept to remove all locks and prevent them becoming embedded in the next fleece. *Skirting.*—The object should be to remove all wool that is inferior to the fleece. Usually in this district it is only necessary to remove the following:—A little wool from the breech, because of it being on the strong side and carrying a little stain (in the case of ewes), and sweat formations on armpits; and second cuts and any shorter wool from the head, necks, and backs do not, as a rule, need to be removed. *Rolling.*—Just a few inches should be turned in on one side and the fleece then brought over, the result is that when the fleece is rolled the shoulder is exposed. *Classing of Fleece.*—The object should be to make lines as even as possible, the main factors being quality, condition, soundness, and length, while the character, bulkiness, and color must also be considered. An objection is sometimes raised to detailed classing because it makes too many lines. A man that has 20 types of sheep deserves a little trouble. Surely if a man gives consideration to the value of his wool he will keep his flock fairly even. *Pieces* should be picked if quantity warrants expense. The same might be said of lamb wool. *Locks.*—Remove all heavy matter, it does not pay freight. *Pressing.*—Handle fleeces carefully, the wool looks better on show floor and catches the eye of the buyers. At cut out it is advisable to start pressing at top lines and go downwards, then any wool over a bale can be placed in a lower grade and thus save bag lots.

FIRE FIGHTING.—Meeting held December 6th. Present: Nine members. Discussing this subject, members thought that the district council should do something in the way of providing fire-fighting appliances. They accordingly appointed Messrs. M. Telfer, G. Altschwager, and the Secretary to wait on the council at its next meeting and see what arrangements could be made. (Secretary, Mr. H. Kennedy.)

UPPER-NORTH DISTRICT.**(PETERBOROUGH AND NORTHWARD.)****EURELIA** (Average annual rainfall, 13.06in.).

Meeting held October 1st. Present: Seven members. Mr. C. Phillis gave an account of an interesting trip to Lake Tinker, and reports of the Annual Congress were received and discussed.

Meeting held November 1st. Present: Mr. G. Hall (Chair), 15 members, and eight visitors. Members discussed the subject, "Poisonous Plants." (Secretary, Mr. E. Wall.)

MORCHARD (Average annual rainfall, 13.50in.).

Meeting held October 3rd. Present: Mr. H. Tilbrook (chair) and 12 members. Messrs. A. R. Long and R. McCallum debated the subject "Harvester v. Header" and delegates to the Annual Congress tendered their reports. (Secretary, Mr. H. McCallum.)

QUORN.—Meeting held October 8th. Present: 11 members. Officers were elected, after which an address, "Sheep on the Farm," was delivered by Mr. F. Lehmann. (Secretary, Mr. O. Noll.)

WARCOWIE (Average annual rainfall, 12.16in.).

October 9th.—Present: 15 members and 10 visitors.

Mr. C. McKenna, B.V.Sc. (Veterinary Officer of the Stock and Brands Department) delivered an address, "Common Ailments of Farm Stock."

POULTRY.—A paper on this subject was read at the meeting held on November 11th, which was attended by 16 members and 25 visitors:—"To make poultry a paying proposition plenty of time and considerable trouble is necessary in rearing, feeding, and looking after the birds. For egg production the White Leghorn is the best breed. The first essential is a netting yard with plenty of room to provide for exercise and small houses in which hens can lay. These should be white-washed all over to prevent tick. A small plot of lucerne will prove a valuable addition to the fowls' diet. Wheat, bran, and pollard mixed with a little salt is also good for laying hens. If rabbits are plentiful they can be cooked and fed to the birds. The Minorca is a good table fowl, and turkeys are generally in demand at Christmas. The Black Orpington is a very good layer and an excellent table bird. When breeding, old and young ones should be kept apart for the best results. Poultry should be set during the months of August and September. (Secretary, Mr. A. Crossman.)

WILMINGTON (Average annual rainfall, 17.63in.).

Reports of the delegates who represented the Branch at the Annual Congress were received and discussed at the meeting held on October 14th. On the following day, in company with the District Agricultural Instructor (Mr. E. L. Orchard) members and visitors made a tour of inspection of the crops of the district. (Secretary, Mr. H. Stevens.)

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

October 13th.

In company with Messrs. E. L. Orchard and J. B. Harris (District Instructors), 15 members and three visitors made a tour of inspection of members' farms and orchards. At the evening meeting Mr. Orchard delivered an address, "Hay and Hay-making." (Secretary, Mr. J. Halse.)

BELALIE NORTH (Average annual rainfall, 17.84in.).

October 25th.—Present: 12 members.

An instructive meeting took place when the subject, "Power Farming," was debated. Messrs. J. Atkin, H. Cummings, and A. Bray supported power farming while Messrs. F. Cummings, M. Warner, and E. Carmichael opposed it. The judges, Messrs. F. Carmichael and J. Collier decided in favor of the latter by 194 points to 169. (Secretary, Mr. E. Carmichael, Jamestown.)

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Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury.

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GLADSTONE (Average annual rainfall, 16.40in.).

A well attended meeting of the Branch was held on November 21st, when Mr. H. B. Barlow (Chief Dairy Instructor) spoke on the subject, "The Dairy Act." (Secretary, Mr. F. Chick.)

MURRAYTOWN.—Meeting held November 1st. Present: Mr. B. Starr (Chair) and 12 members. A report of the Annual Congress was presented by Mr. F. Borgas. On November 12th members made a tour of inspection of the crops in the western portion of the district. Afternoon tea was provided at the residence of the Secretary, Mr. E. Pitman.

SNOWTOWN.—Meeting held October 11th. Present: 12 members and four visitors. Mr. K. Ashby read a lengthy paper, "A Comparison of the Tractor with Horses." (Secretary, Mr. A. Hocking.)

WANDEARAH.

Meeting held October 1st. Present: 13 members. Mr. J. O. Hatter (Dairy Instructor) delivered an address, "Dairying on the Mixed Farm."

A further meeting held on October 18th was attended by 10 members and six visitors. A report of the Annual Congress was presented by the chairman (Mr. W. Slater). (Secretary, Mr. J. O'Shaughnessy, Wandearah East.)

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BRINKWORTH (Average annual rainfall, 16.01in.).

October 6th.—Present: 22 members.

Mr. R. Booth gave an instructive address, "The Improvement and Cross Breeding of Wheats." Mr. H. Snow reported on the Annual Congress.

On February 22nd Mr. E. Carlyon presided over an attendance of 18 members. Arrangements for the Annual Inter-Bureau Seed Wheat Competition were discussed. (Secretary, Mr. H. E. Ottens.)

EUDUNDA.—Mr. H. Michael presided over an attendance of 13 members and four visitors at the meeting held on October 13th. Mr. H. B. Barlow (Chief Dairy Instructor) delivered an address, "The Breeding and Rearing of Pigs." (Secretary, Mr. L. Duldig.)

LIGHT'S PASS.

October 6th.—Present: 33 members and visitors.

Messrs. J. Leslie, A. Chapman, and T. Roenfeldt reported on the Adelaide Congress. Mr. H. Scholz delivered an address, "First Aid to the Injured."

Mr. J. B. Harris (District Horticultural Instructor) addressed a meeting of 33 members on November 3rd on the subject, "Successful Fruit Growing."

Pigs.—Mr. W. Sporn read the following paper at the meeting held on December 1st, which was attended by 38 members and visitors:—"So far as breeds are concerned, I find the Berkshire is the best pig, although the progeny of the Berkshire crossed with a Tamworth or Essex are also good pigs for profit. The sty should always be kept clean, with plenty of straw, and the young pigs should also have a yard so that they can have plenty of exercise. The sow must be fed well to rear the litter, which should consist of from 10 to 12. Feeding with plenty of skimmed milk, with crushed oats or pollard, is a good food, although I prefer crushed oats to pollard. After the young pigs are three weeks old I advise feeding them separately; they are then old enough to learn to feed themselves. This should be done to prevent the sow from becoming low in condition. Feed young pigs on skimmed milk with barley that has been soaked in water for a day. When the piglets are six to eight weeks old, wean them; they are then old enough to feed themselves, and it will also give the sow a chance to pick up again. Should there be some small pigs in the litter, leave them with the sow for another two weeks or so. Great care must be taken to feed the young pigs well after weaning them; if they are neglected at this stage they will become stunted. Fed properly, they should be ready for the market as porkers in about four or five months. Pigs for profit should be sold as porkers; there is always a better demand for porkers than for bigger pigs. When taking pigs to market or transferring them to a different sty on a hot day, care must be taken not to over-heat them; they do not stand much handling on warm days, and die very easily if over-heated." Mr. W. Ahrens read an instructive paper, "Bee Keeping." (Secretary, Mr. C. Verrall.)

NANTAWARRA (Average annual rainfall, 15in.).

October 2nd.—Present: Eight members.

Mr. E. Hamdorf read an article, "Bots and Tetanus in Horses." Discussing the paper, Mr. Starkey said bots sometimes caused stoppage in the stomach and considered treatment expensive, unless the animal was a valuable one. Tetanus, he considered, was more prevalent in intensely cultivated countries rather than in Australia. Mr. C. Nicholls advocated rubbing a preparation on the horse's jaw to prevent bots from laying eggs there. Mr. Durdin lost a horse from bots, and gave the following remedy:—Starve horse for 48 hours and treat with a solution of sugar and oil. Mr. Herbert did not think bots were so prevalent now as seven or eight years ago, and spoke of information gained from the late Mr. Place when he conducted a veterinary school at Nantawarra some years ago.

Mr. E. Hamdorf presided over an attendance of eight members at the meeting held on November 6th, when an instructive paper, "First Aid," was presented by Mr. W. Starkey. (Secretary, Mr. N. Robinson.)

WASLEYS.

October 9th.—Present: 28 members and two visitors.

WEEDS AND FUNGUS DISEASES ON THE FARM.—Mr. C. Currie read the following paper:—"Weeds are often overlooked by the farmer and cause little or no concern, but they do directly and indirectly cause a considerable loss to the man on the land, for the following reasons:—(1) Robbing from fallow the moisture which has been placed in it by tillage. (2) The extra workings caused, which are of little or no value to the fallow, during certain periods. (3) Decreasing the value of seed wheat when infested with weed seeds. (4) Lessening the value of wool, because of the burry seeds of many weeds. Weeds on fallow are all robbers of moisture, and, with the exception of a little sheep feed, are little or no value, and even though the weeds be returned to the soil after they have been killed, they have used in the short period plant food which it has taken months to place in the soil. It is, therefore, desirable to destroy them before they grow to any large size, either by means of cultivation or sheep. They often prevent further cultivation, which is of particular value during the summer months, when it is often impossible and undesirable for the farmer to attend to the fallow on account of harvest. Weeds such as soursobs, dandelion, charlock, three-cornered-jack, vetches, &c., should be ploughed under at fallowing time, and little trouble will be experienced with them on the fallow afterwards. The complete destruction of the soursob is impossible, owing to its bulbing nature, but if well cultivated from time to time, when flowering, will keep them in check and prevent them from making more bulbs. Seeding operations should be carried out late in the season, after the bulbs have germinated, and if sown with a fairly vigorous growing variety of wheat they cause little damage. Land infested with vetches should be treated in the same manner. Cattle and sheep do not eat them very readily when green, and if the crop is sown before the seeds germinate they check the growth of the crop during wet periods. The worst weeds in the district are wild mignonette, three-cornered-jack, and mustard. Every precaution should be taken to destroy the mustard and wild mignonette, the crop cannot be reaped without getting the seed in the grain, and any plants should be pulled and destroyed before they reach the seeding stage. Summer weeds, such as paddy and wild melon, stinkwort, potato weed, artichoke, and buck-bush, &c., are best destroyed (if too large an area is not too infested) with a hoe or grubbing axe, because no harm is done to the fallow; but if a large area has to be treated, the blade attached to the cultivator, or (if the land is too stony for its use) wide shares can be used with good results, and little damage is done to the fallow if worked shallow and is done after rain. *Noxious weeds.*—It should be the aim of every inhabitant of a district to destroy all noxious weeds. When a new variety is seen it should be destroyed, for often a few weeds are the means of spreading seed over a large area. Bathurst burrs and star thistles should be destroyed prior to flowering; if cut when gone to seed they blow about with the wind, scattering the seeds worse than if they were not cut. *Wheat Diseases.*—Many of the diseases common in cereal crops can be checked considerably by keeping the fallow free from wild oats and barley grass. Stubbles of crops which have been affected with diseases should be burned; if ploughed in they have a tendency to affect the crop following it. Take-all can be considerably overcome by good fallowing methods and a system of crop rotation, which places the land in such a good condition as to be able to ward off this and many diseases from the young plant. Trouble can be minimised if wheats immune from many of the worst diseases are sown, such as Nabawa and Sword, which are flag-smut resisting. Care should be taken when purchasing seed grain from other districts that no foreign weed seeds are contained in it, many bad weeds are spread about through not taking this precaution. If seed is not badly affected with bunt, copper carbonate at the rate of 1oz. to 2ozs. per bushel is the best method of control, but if badly affected I favor sprinkling the grain with a

solution of formalin at the rate of 1lb. to 60galls. of water, and for barley 1lb. to 40galls. of water. If the seed is too badly affected with bunt, do not use it for seed purposes—prevention is better than cure.”

A combined meeting of the Women's and Men's Branches was held on January 8th, when Mr. H. B. Barlow (Chief Dairy Instructor) delivered an address, “The Dairy Act.” (Secretary, Mr. C. Currie.)

ROSEWORTHY.—Meeting held October 13th. Mr. A. R. Hickinbotham, B.Sc., Dip. Ed. (Chemist, Roseworthy Agricultural College), delivered an address, “Chemistry as Applied to Agriculture.” (Secretary, Mr. E. Oates.)

YORKE PENINSULA DISTRICT.

(TO BUTE.)

ARTHURTON (Average annual rainfall, 16in to 17in.).

Meeting held October 30th. Present: Mr. J. Hentschke (Chair), 15 members, and five visitors. Mr. R. Burns read a paper, “Economy on the Farm,” and reports of the delegates who attended Congress were received and discussed. (Secretary, Mr. T. Howlett, Moonta.)

KILKERRAN.

October 7th.—Present: 14 members.

CONSERVATION OF FODDER.—The following paper was read by Mr. B. Koch:—“This is a matter which concerns every farmer, especially in time of drought. A good standby is a stack of sheaved straw, which should be cut in a good season. A stack of loose straw is also very helpful for stock that are not working. If a quantity of salt is added to the straw the stock will eat it much better and they will not be so liable to constipation. Oats is a very good fodder, and the grain can be stored for a very long time without being spoiled by weevil. If stored loose, mice and rats will not damage it. Oats are an excellent ration for fattening sheep when other paddock feed is scarce, the stock will not eat so much chaff. Chaffed straw and oats with a little molasses added makes very good feed in time of drought. Where much stock is kept a good haystack should always be held in reserve. This should be surrounded with a mice-proof fence and covered with a thatch of straw. Farmers should always conserve a certain amount of fodder, it is cheaper to produce fodder than to buy same, and if conserved when cheap the amount saved on drought prices will easily pay the interest on the outlay. Storing oats can be done by making a compartment in a shed, then, if it is desired to leave some in bags, place a layer of bags on the bottom then fill all space with loose oats. This will take about as much loose oats as if they are bagged, therefore a space large enough to stack 50 bags of oats in bags will hold about 100 bags. When all the space between the bags are filled, and a layer of about 6in. placed on top, it will prevent mice getting at the bags.” Mr. B. Koch read a paper, “Harvest Machinery.” (Secretary, Mr. A. Dutschke.)

PASKEVILLE (Average annual rainfall, 15·64in.).

Seventeen members attended the meeting held on October 7th, when delegates to Congress gave reports of papers, &c., read at the various sessions.

A lecture was delivered by an official of the Royal Automobile Association at the meeting held on November 4th.

A further meeting attended by 17 members and four visitors was held on February 3rd. Mr. H. Price read an instructive paper on “Fencing.” (Secretary, Mr. J. Prouse.)

PETERSVILLE.

October 7th.—Present: Nine members.

HARVEST PREPARATIONS.—Mr. K. Wood read the following paper:—“Prior to the commencement of harvesting operations all machinery that is to be used should be thoroughly overhauled and placed in good working order. As it is the aim of every farmer to take off his crop in as short a period as possible, this is important. The binder should have all old grease removed from its bearings, rust cleaned from the retainer and knotted, bolts and chains tightened, and the canvasses inspected to see that straps are fixed securely. Straighten up fingers and sharpen the knife. Cut around the crop and plough firebreaks. When hay cutting is finished, take off canvasses, roll up, and put away out of reach of rats and mice. In the case of the harvester, adjust comb thresher, clean and tighten bearings; if belts are used, give a good dressing of Neatsfoot oil. Examine chains for worn links, and put fresh wicks in the oil wells. Where a tractor is used, remove cylinder head, clean out carbon, &c., have an efficient spark arrester fitted to the exhaust to minimise the risk of fire.

If using horses, have them shod, give all harness an oiling, and see that all swings and chains are in good order. Have plenty of bags and oils on hand. If this is done very little time should be lost during harvest." Mr. Duke reported on the Adelaide Congress.

Under the auspices of the local Branch a meeting was held in the Ardrossan institute on November 4th, when Mr. Crewe, of the Vacuum Oil Company, gave an address illustrated with moving pictures, "Oil and Its Products." (Secretary, Mr. A. G. Dutschke, Ardrossan.)

SOUTH KILKERRAN.

October 7th.—Present: 12 members.

Matters relating to the barley experimental plots were discussed. During the afternoon of November 3rd 12 members and 12 visitors, accompanied by Mr. R. Hill (District Agricultural Instructor) inspected the barley experimental plots. In the evening Mr. Crewe, of the Vacuum Oil Company, delivered an address, "Oil and its Products."

HARVEST REPORTS.—At the meeting held on February 3rd, which was attended by 10 members, it was reported that yields for the 1930-31 harvest would not exceed 12bush. to 15bush. Best varieties were Sultan, Phoenix, Ford, and Waratah. Barley averaged 15bush. (Secretary, Mr. H. Schrapel.)

WEAVERS (Average annual rainfall, 17.03in.).

Meeting held October 18th. Present: 13 members and two visitors. Mr. R. Hill (District Agricultural Instructor) delivered an address, "Conservation of Fodder."

Addresses on phases of the dairying industry were delivered by Messrs. H. B. Barlow and H. J. Apps (Department of Agriculture) at the meeting held on October 20th; 16 members and 11 visitors were present. (Secretary, Mr. H. Cornish, Stansbury.)

WESTERN DISTRICT.

CARALUE.—Meeting held October 8th. Present: 17 members and 45 visitors. Mr. R. Jones gave an address, "The Foot of the Horse," and Congress reports were received. The meeting then took the form of a social evening. On October 13th Mr. W. J. Spafford (Deputy Director of Agriculture) addressed a meeting, which was attended by 15 members. (Secretary, Mr. E. Marshall.)

GREEN PATCH (Average annual rainfall, 26.56in.).

October 2nd.—Present: 10 members.

The meeting was held at the residence of Mr. C. J. Whillas. Reports were received from delegates who represented the Branch at the Annual Congress.

Mr. E. Chapman presided over an attendance of 12 members at the meeting held on November 13th, which was held at the residence of Mr. P. Sinclair. Matters of local interest were discussed.

Members met at the residence of Mr. T. Murray on December 4th, when Mr. H. D. Adams (Agricultural Instructor) delivered an address, "The Fat Lamb Industry." (Secretary, Mr. C. J. Whillas, Port Lincoln.)

MEGGITT'S LINSEED MEAL.

The seasonal reduction during certain months of the year in the output of milk, cream, butter, and cheese, can definitely be checked by the use of Meggitt's Linseed Meal.

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SELLING AGENTS IN SOUTH AUSTRALIA.

KAPINNIE. October 14th.

Mr. J. Lawrence presided over an attendance of 23 members and 21 visitors. Addresses were delivered by Messrs. W. J. Spafford and H. D. Adams, of the Department of Agriculture.

During the afternoon of November 21st the annual inspection of crops took place. The evening meeting, which took the form of a social, was attended by 24 members and 50 visitors. (Secretary, Mr. E. Wannon, Brimpton Lake.)

MANGALO (Average annual rainfall, 14in. to 15in.).

October 6th.—Present: 12 members.

The meeting discussed important matters relating to the stacking of 1930-1931 harvest at Mangalo.

Meeting held November 3rd. Present: 11 members. Mr. F. Coll reported on the Adelaide Congress and the Kimba Conference. (Secretary, Mr. C. Hannemann.)

MINNIPA (Average annual rainfall, 14.68in.).

Meeting held September 30th. Present: 12 members. Mr. J. Head gave a report of the Annual Congress. (Secretary, Mr. F. Williams.)

MUDAMUCKLA.

October 11th.—Present: 13 members.

Mr. W. H. Watson read a paper, "Working Up and Putting In a Crop on Old Land at Seeding Time." He considered breaking up the land with a cultivator and then drilling in with the combine, followed by the harrows a few days after combining, to be the best method. A good discussion followed. Mr. Maquire, as delegate to Annual Congress, gave a report of the proceedings of the Annual Congress. (Secretary, Mr. T. Zippell.)

PETINA (Average annual rainfall, 13.02in.).

Meeting held September 23rd. Present: Mr. W. Schulz (Chair) and 13 members. Several matters including the advisability of continuing the crop competitions, were discussed. (Secretary Mr. E. Jones.)

PYGERY.

October 7th.—Present: 24 members.

An instructive paper, "The Production, Cost, and Price of Wool," was read by Mr. L. Humphries. Congress reports were received and discussed.

SCRUB CLEARING.—A paper on this subject was read at the November 4th meeting by Mr. R. Ingram:—"The most popular method is the scrub roller. The roller is usually an old steam boiler with an axle through the centre and a frame built on or over the top. Usually for a horse team the roller is built with the frame over the top, with a pole and wheel in front and a breaker bar 6ft. to 8ft. high. With a tractor, the frame may be on a level with the axle and no wheel in front, but connected straight to the tractor. *Logging.*—The log is usually about 10ft. to 12ft. long, with two teams or tractors to drag it along. Some logs are built with a frame and breaker bar. Usually two teams or tractors are used to draw it along, but one tractor may be used in light scrub. The scrub devil is a high frame on two stout wheels, with a pole and front wheel. It is usually built after the style of the scrub roller, but the pole may be placed in the centre and the tractor go through the scrub. The scrub devil is used in heavy timber where it would be difficult to use a roller or log. It would be advisable to hire axemen in scrub that has been heavily timbered and burnt and consists of young trees about 15ft. high, as it is very rough on team or tractor. The scrub in this district may be classified as follows:—First, the heavy timber that is anything over 20ft. high; second, the medium scrub, anything from 10ft. to 20ft. high; the third and easiest to clear is the light bush below 10ft. in height. The tractor is the best for clearing scrub; it saves time, and there is not so much nicking to do as with a horse team. For a person taking up a scrub block a tractor would be best, as there is no water to cart. All that is needed after the scrub is knocked down is a good fire. Felling that, stick picking has to be done." A further meeting held on December 2nd, attended by 25 members, took the form of a Question Box. (Secretary, Mr. A. Day.)

ROBERTS AND VERRAN.

October 8th.—Present: 15 members.

An instructive paper, "Harvest Preparations," was contributed by Mr. V. Jonas.

MARKETING WHEAT.—The following paper was read by Mr. F. Imhoff at the meeting held on November 5th:—"In the preparation and marketing of wheat the sample should be free from all foreign matter. One of the failings of many Australian farmers is to sell wheat containing all sorts of rubbish, and to command the best price

and demand is an object which should be aimed at. If buyers in the overseas markets were sure of a good clean sample there would be a greater demand for our wheat. Varieties most suitable for foreign markets, wheats to blend with the red wheats of other countries, should be grown. Bulk handling would reduce the cost of handling and shipping and help to create a better price. At the present time there are only two ways of disposing of wheat: one by way of selling it to the wheat merchant, a system which has stood the test of many years; secondly, by the pooling system. Until all farmers support it, the pooling system cannot be worked to its full advantage, and by working in with the pooling systems of other countries the full benefits will be gained." Discussing the paper, Mr. M. Masters advocated selling wheat by grades instead of on a f.a.q. basis. Mr. J. Smith said that while bulk handling that would be costly to install, it would result in a reduction in handling charges. Mr. H. Mahar stressed the importance of the need for using a grader and only sowing the best and cleanest seed. Messrs. S. Barber and P. Busche spoke in favor of pooling. Messrs. E. Pobke, L. and H. Ramsay, C. Masters, L. Gordon, and J. Busche also spoke. (Secretary, Mr. C. Masters.)

TALIA (Average annual rainfall, 15.27in.).

Mr. F. Elliott presided over an attendance of 18 members and two visitors at the meeting held on October 11th, when addresses were delivered by Messrs. W. J. Spafford and H. D. Adams, of the Department of Agriculture. (Secretary, Mr. A. Thomson, Elliston.)

WIRBULLA.—Meeting held September 25th. Mr. F. Lovegrove presided over an attendance of nine members and six visitors. A paper, "Horses v. Tractor," was contributed by Mr. J. Pearson. (Secretary, Mr. H. Doley.)

WUDINNA (Average annual rainfall, 13.68in.).

October 3rd.—Present: 13 members.

FARM ECONOMY.—A paper on this subject was read by Mr. A. Shepherd. In the discussion that followed Mr. Hollams favored borrowing money from the bank to purchase implements rather than buying on the time-payment system. Matters of local interest were also discussed.

Meeting held November 1st. Present: Nine members and six visitors. Reports of the Annual Congress were received and discussed. Mr. C. Newbon gave an address, "The Clydesdale Horse."

A meeting held on December 23rd was attended by eight members. Matters in connection with the Crop Competitions for 1930-31 were discussed (Secretary, Mr. C. Newbon.)

YADNARIE (Average annual rainfall, 14.09in.).

Meeting held October 14th. Present: 10 members. Mr. M. Way read a paper, "Grading Wheat for Export". A keen discussion took place on the subject. "Side Lines on the Farm" (Secretary, Mr. C. Deer, Cleve.)

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

ALAWOONA.—Accompanied by the District Agricultural Instructor (Mr. R. L. Griffiths) 13 members of the local Branch and 25 visitors from the Caliph and Veitch Branches inspected the plots on the Veitch Experimental Farm, under the guidance of the Manager, Mr. L. Smith. (Secretary, Mr. B. Finly.)

BRINKLEY.

Meeting held October 9th. Present: 18 members and two visitors. Congress reports were received and discussed.

Twenty members and four visitors attended the meeting held on November 5th. Matters of local interest were introduced for discussion. (Secretary, Mr. C. Pearson.)

COPEVILLE.—Meeting held October 15th. Present: 12 members. Reports of delegates to Annual Congress were received and discussed. On November 18th a large number of members and visitors, in company with Mr. R. C. Scott (Superintendent of Experimental Work) inspected the plots being conducted on the property of the Secretary (Mr. G. Sutherland).

CLANFIELD (Average annual rainfall, 16in. to 17in.).

Meeting held October 16th. Present: eight members. Mr. L. Orwell read a paper, "The Chamber of Rural Industries," and reports of the delegates to Congress were received and discussed. (Secretary, Mr. W. Pearce.)

KALYAN.

October 15th.—Present: Eight members.

CARE OF THE BREEDING EWE AND MARKING AND TAILING LAMBS.—Mr. R. Lang presented the following paper:—When financial difficulties and bad times confront the producer, more precautions should be taken with the flock. Bad seasons have made sheep-breeding more difficult these last few years. That is the time when breeders should provide better management of the flock. The flock should be inspected every day, to see that the sheep are all right. Breeding ewes should receive first consideration. It is advisable to keep the breeding ewes in a separate paddock. The flock should be mouthed, and faulty and weedy ewes culled out for rations or fattened and sold. Mouth the ewes just after shearing, and after lambs have been weaned. It does not pay to breed from an old ewe. She is never in such good condition as a younger ewe, nor is she so able to stand the strain of rearing a lamb. The best ages of ewes to breed from are from a 4-tooth to a full mouth. When mouthing and culling, only the best, youngest, and strongest ewes should be kept for breeding. The ewes chosen for breeding should be put in a good paddock, separate from the other sheep, and the rams put with them. Rams should never be put in any later than early December. This will procure an early lamb, which will be well grown in the spring, when feed is good. The ram is just as important as the ewe; the ram must not be too old, and should be in as good a condition as the ewe. After the rams have been mated with the ewes, they should either be frequently yarded or mustered into a small paddock over night. This will give a better lambing percentage and more even lambing. This should be done for the first five or six weeks after the rams have been put in. During the mating season the ewes should be allowed to graze on good pasture. This will give a good percentage of lambs. The ewe will be strong and in good condition, and will rear a good lamb. A month or five weeks prior to lambing the ewes should be got in, crutched and wigged, and the rams removed from the ewes. Crutching gives the lamb a better chance of finding the teats when it is young. It also minimises the danger of the ewes getting flyblown after lambing. When crutching the ewes, do not handle them roughly, otherwise losses may be expected. When the lambing season commences the ewes should be inspected once a day, to see if any of the ewes are down or need attention, and if any of the ewes that have lambed have left their lambs. All dogs should be kept out of the lambing paddock. A good plan, if it is possible, is to shift the ewes with the strongest lambs from the lambing paddock to a fresh paddock. This can be done after the lamb is about a week old. A little time spent in this direction is well worth while. Changing the ewes and lambs from one paddock to the other where feed is better enables the ewe to give more milk and the lamb will grow stronger and faster. On no account should a ewe with a lamb be placed on dry feed. If drought conditions prevail and hand feeding has to be adopted, the ewes should be given such food as will make milk for the lamb; otherwise it is just as well to sacrifice the lamb to save the mother. Before tailing operations commence, all yards that are going to be used should be cleaned out and all refuse carted away. If tailing operations are performed with a knife, it should be well sharpened and sterilised before it is used. The day of tailing should be of moderate temperature, operations should be started early in the morning, and sufficient hands available to finish by about 3 o'clock in the afternoon. This will give the ewe time to mother her lamb before darkness sets in. An inspection should be made of the flock to see that everything is all right, because if the next day is sultry or hot, some of the lambs may have been affected by flies or need attention in some other way. The flock should be left to settle down for the first two or three days before driving or shifting any great distance. Tails, &c., should be cleared out of the yard and either burnt or buried. Finally, sprinkle the yard with disinfectant, such as milk oil fluid, and leave the yard fresh and clean for the next time it is to be used." (Secretary, Mr. R. Lang, Goondooloo.)

LAMEROO (Average annual rainfall, 16.19in.).

October 10th.—Present: 13 members and two visitors.

The District Agricultural Instructor (Mr. R. L. Griffiths) delivered an address, "Factors Controlling Wheat Yields in the Mallee."

SHEEP ON THE FARM.—The following paper was read by Mr. R. Pocock at the meeting held on November 22nd:—It is recognised that for the successful cultivation of wheat, sheep play an essential part on the farm. With costs of wheatgrowing continually mounting up, it will be readily seen that for the capital laid out the margin of clear

profit will be greatly in favor of sheep. At this period in our history, when every effort is being made to make our country pay its accounts overseas—wool and meat being commodities that are relatively cheaply produced—farmers must devote more attention to wool and fat lambs. It can be said with as much truth as ever that “Australia is carried on the back of the sheep.” In our district, which is essentially a wheat area, for profitable management the farm is most efficiently worked on a system which allows wheat to be grown once in every three years, thus allowing one year of feed off stubble land. In the first place, the wheat crop will do better and the land be kept in a more vigorous condition. To keep fallow in good condition on land that has previously laid out, extra working of the fallow is practically essential. These workings are reflected in the crop of wheat. The management of the sheep may be divided into the following headings, and in certain conditions either method may be made profitable:—(1) Merino flock kept entirely; (2) pure bred Merino ewes mated with English rams; (3) Cross ewes of Merino formation with English rams; (4) pure bred English breeds. Merits of each breed as it applies to this district:—(1) The pure bred Merino flock is only practical on a large holding and where hand feeding is not the general practice and aims at the production of ewes for sale and wethers. In a flock of this description about half of the flock is readily saleable, leaving the breeding flock of ewes to be kept in times of poor seasons. Some flocks of this description are very valuable in a district, for from them good lines of ewes are available, but as a general practice, this method of sheep keeping cannot be considered as most useful here. (2) Merino ewes mated with English rams.—For general practice, the large-framed, clean-faced, and active Merino is a sheep hard to beat for the production of fat lambs for market. As time goes on these sheep will be more difficult to procure. Farmers generally will find that money is well spent in paying for a good class of young ewe. At the recent large sales in the north it was noticeable that for short yardings of 2-6 tooth ewes good values were paid for them. This is rightly so, because the fleeces grown give a fair margin on the amount paid for the sheep. Also these sheep will be useful on the farm until six years old. There is a wide selection of rams to mate with these sheep, but it is generally recognised that the Down breeds of sheep are the best for the production of a lamb for the English and local markets, i.e., a lamb whose live weight is 64lbs. to 70lbs. and dresses 32lbs. to 38lbs. My choice of rams is the Southdown, Shropshire, or Suffolk. Mated with pure Merino ewes, these sheep give more block formation of carcass and mature early. The Dorset has found great favor, but, nevertheless, they do not, as a general rule, fulfil the requirements of the short, compact carcass so necessary for export. (3) Cross bred ewes as a flock mated with English rams.—I also include the Corriedale under this heading, for it is generally considered a crossbred sheep. This method of lamb raising is a good one, and it will be noticed that in the awards of prizes to fat lambs at the most important shows the crossbred ewe is usually responsible for raising the first prize lambs. They mature early, grow quickly, and the ewes are much better milkers. Thus the lambs are more sappy and presentable at the bloom stage when a lamb is marketed. The production of lambs from these ewes is generally fitted for the districts where the rainfall is a little better than in the mallee; at least this is generally recognised. From personal observations I see no reason why the crossbred ewe could not be kept. They do well at home and also on other people's feed, and the latter point I suggest as practically the only serious disability. The wool of these sheep brings good money—as much per lb. as the Merino—but weights are not equal to Merino. This type of ewe for fat lambs will be used more extensively. (4) The use of pure English breed.—This is not an especially good method for raising fat lambs; the sheep are sluggish and do not mate quickly and it is difficult to obtain a line of early lambs from pure ewes. Merino and Merino cross ewes are much quicker and less trouble, therefore, for general purposes, this method is of little interest. Points worth bearing in mind.—Do not try and breed from ewes that are too young, or mortality will be heavy where English rams are used. Always obtain clean-faced sheep when buying replacements. Do not cut tails too short when marking lambs; this increases fly trouble. Machine crutching is practically essential, and, if possible, should be done about four to six weeks after shearing, and again in March. The expense of this practice will be overcome by the use of small plants used by several owners. I suggest that a class for fat lambs be included in the local show; live weight to be 62lbs. to 70lbs. and judged for the best turned out lamb at the weight. Hand feeding of sheep for market is not a payable proposition and may be done only in a moderate way with lambing ewes and stud stock. Another reason is that in times when it is necessary to feed, sheep are forced on the market and one is usually found feeding food, which is gradually rising in price to sheep, the value of which is getting cheaper. It is better to keep a few less sheep and save the worry for some one who will buy your reserve fodder. (Secretary, Mr. R. Koch.)

MARAMA.—Congress reports by Messrs. Rogers and Hinkley were received and discussed at the meeting held on October 29th. Fifteen members were present. The meeting held on November 15th was attended by 15 members. Mr. T. Hinkley (Hon. Secretary) read a paper, "Wool."

MILLENDILLA.—Meeting held October 2nd. Present: seven members. Mr. B. Scheer spoke on the subject, "The Farmers' Freedom Association." (Secretary, Mr. V. Wegener.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

October 18th.—Present: 14 members.

FARM BLACKSMITHING.—Mr. M. Kuchel read the following paper:—"A blacksmith's shop on the farm will save many a trip to the township and loss of time in repairing breakages which are inseparable from cultivator and harvesting work. At periods which are not busy on the farm, odd jobs can be done and old material which would otherwise be thrown on the scrap heap can be used in making handy appliances for farm operations. The shop should be equipped with a forge, anvil, vice, drilling machine, some tongs, a couple of hammers of different weights, a sledge hammer, an assortment of punches and chisels, wrenches and spanners, a set of taps and dies suitable for threading all sizes of bolts from $\frac{1}{4}$ in. up to 1 in. in thickness. With these tools a farmer can do numerous jobs, such as making eyebolts, S hooks, split links, sharpening ploughshares, crowbars, picks, &c. In welding it is necessary to keep the fires and irons to be welded clean and free from clinker. The iron should be heated to a white heat. Old tyres from a buggy or spring-dray can be made into very good gates. In preparing to weld two pieces of iron, see that both reach the proper heat at the same time. Heating should proceed smoothly and gradually. Share sharpening is one of the most important jobs on the farm, and requires a certain amount of skill. Do not overheat or burn the shares; draw the metal down to a fairly long edge and see that the share is perfectly level and straight on the bottom. Broken set-screws in pulleys or cogs may be removed by sawing a nick across the set screw, then if the set-screw will not move with a centre punch, bore a small hole so that a larger drill will follow through the set-screw without running into the casting. A few carpenter's tools and a soldering outfit will also add to the usefulness of the equipment. Many kinds of fluxes can be used for soldering, but 'killed' spirits of salts will solder tin or galvanised iron. To kill spirits of salts, place a small quantity of the spirits in an open-mouthed bottle, add a few pieces of zinc, and when the spirits have finished boiling, remove the zinc which has not dissolved and add one-third of rain water and a few shavings of sal ammoniac. In handling spirits of salts be careful that none touches the hands, as it is apt to be very painful; also see that none gets on the clothes. See that the iron is well tinned and clean. In tinning an iron, heat to soldering heat, then polish with an old file and rub in a piece of sal ammoniac into which a piece of solder has been dropped. See that all tools are in a handy position, so that they can be found without any trouble. Have a place for everything and keep everything in its place."

BOOKKEEPING.—Mr. V. Lehmann read the following paper at the meeting held on November 15th:—"Present indications point to the fact that it is likely to become increasingly difficult for the farmer to make a living unless he can find means for reducing costs of production. It is unlikely that there will be any very great increase in the price which his commodities bring, therefore it is our duty, if we are to succeed through this depression, to keep a correct account of all matters which our farms produce. If we know certain lines are not paying, we should at once investigate every possible way of making economies. The achievement of this can be accomplished in various ways, and is mostly within the power of each individual farmer. Improvements and innovations which tend to improve farming methods are constantly being introduced, and to be truly efficient the farmer must keep ever in line with these. To be able to run any business, and at the present time farming is as much a business as any other line of production, the proprietor must have some means of analysing his various costs and of telling where and how his methods need revision or elimination. Every farmer should have some method of bookkeeping which will enable him to know what lines are and what lines are not proving economical. Unless he knows this, it is practically useless to attempt any improvement in his income. Farm bookkeeping is a complicated business and not to every farmer's taste, but the need for it is becoming increasingly great. There are very few farmers in a position to state definitely what their actual costs are, for they do not keep records of their operations or of the results obtained. Records can be kept provided one is prepared to go to some trouble and exercise care. Some knowledge of accountancy is required to assist one in the keeping of such records to determine the cost of different operations, such as tractor and horse maintenance, harvesting, and seeding, also of a much neglected item: depreciation. Few farmers have had the opportunity of acquiring a grounding in proper bookkeeping methods, and after a long and laborious day's work in the field, sitting down to bookkeeping at night is almost out of the question. With the demand of the Taxation Office, due attention to the

keeping of records is necessary. For his own financial wellbeing the farmer should know at the end of the year how and in what direction his business progressed or not. In short, each year he should have a stocktaking. A properly prepared statement will aid him in avoiding or discontinuing various lines that do not pay, and possibly the extension of those things that would pay for more attention, also whether he is putting his energy to the best use. One of the first essentials to keeping of records for the farmer is a full-sized diary and a properly-kept daybook. Once or twice a week the farmer can write up what he has done on each of the intervening days, what he has paid out, what he has received, also records of weather and rainfall if so desired. It should show dates of fallowing, seeding, and harvesting results, with kinds of wheat, etc., stock bought and sold, periods of lambing, numbers of sheep shorn, bought, or sold, and each succeeding year will become a valuable book of reference. As regards finances, periodically the farmer can go through it, and from it enter up in a ledger, which is essential, all receipts and payments. With the diary for reference, matters are simplified for taxation purposes. The farmers' receipts can be reckoned easily as a rule: so much for wheat, hay, stock, cream, eggs, and so on: but in the matter of outgoing monies he is likely to overlook much that could and should be recorded as legitimate expenses. The farmer pays cash for many items, and these should not be forgotten, because in the course of a year they may run into pounds, but if entered in the diary or daybook they can all be totalled at the end of the financial year. When dealing with the ledger, more care is necessary, for the headings should conform as far as possible to the headings in the taxation returns. There should be headings for everything on the farm, including all kinds of livestock, each separate, so that gains or losses can be recorded for each. Then there are poultry, machinery, implements, harness, tools, fencing, sheds, &c., and all the activities of the farm, not forgetting insurance against fire, workmen's compensation, accident insurance, &c. At the end of the year all the balances taken from the ledger should balance with the bank passbook, if all amounts received have been paid in and cheques drawn for all debits. There is still another item to be taken into account, and one in regard to which farmers are prone to overlook, that is depreciation. In reading a business balance-sheet the line 'written off' is frequently observed. It cannot be denied that so soon as buildings, fences, &c., are erected, decay, not noticed perhaps for a long time, sets in, and the same applies to machinery, harness, tools, etc., after a certain age is reached. Depreciation, therefore, should not be omitted from the balance-sheet, and farmers should make reasonable allowance for depreciation of plant and improvements when estimating their income for the year. In justice to himself, and those dependent on him, the farmer should protect himself by keeping a strict account of all his transactions."

WHEAT SAMPLES.—Thirty-seven samples of wheat from the past harvest were tabled at the meeting held on January 24th. These ranged from 55lbs. to 65lbs. to the bushel, with an average of 65 1/7th lbs. approximately to the bushel. (Secretary, Mr. C. Altmann.)

MYPOLONGA.

Meeting held September 24th. Present: Nine members and seven visitors. Mr. P. Collins read a paper, "Unit Values of Manures." Certificates won in the 1930 Pruning Competitions were presented, and reports of delegates to Annual Congress received and discussed. (Secretary, Mr. P. Pickering.)

MOORLANDS (Average annual rainfall, 14.76in.).

October 29th.—Present: four members and four visitors.

CONVERTING A SCRUB BLOCK INTO A FARM.—Mr. W. Coombe read the following paper:—"First choose a site for the homestead, which should be on rising ground, as near the centre of the block as possible, so that all paddocks will open into one home paddock, and if the section is square, this is quite feasible. It also makes it possible to have water laid on to all the paddocks with very little piping. This also has an advantage, in so much as all water troughs are within easy reach of the home, saving much time and worry. Do not forget to include a suitable spot for the orchard and garden. Erect stables and sheds on rising ground and on the east side of the home. The bore should be between stables and house. Plant a row or two of ornamental trees between the stables and the house, and a row of trees and a hedge on the western side of the house to act as a breakwind. The first year a 50-acre paddock should be fenced to provide a plot of early green feed. It is also advisable to grub a patch so that hay can be cut; this is one of the big problems that faces the new settler. The first year roll down as much scrub as possible and put in a big acreage, and leave some to be left under fallow. On new land one can command a bigger acreage than on old land. On new land it is possible to commence drilling in April, and perhaps sown dry, with no fear of weeds. To ensure a fair crop, not less than 70lbs. of super

to the acre should be sown; but with the seed sown early, on new land one may cut it down to perhaps 40lbs. with good results. Fences are an important item on a new block, especially where all timber has to be procured from elsewhere, but one should endeavor to erect a good boundary fence as soon as possible. For division fences, a temporary job will do until a decision is reached as to the subdivision of the block. For rolling scrub, I prefer a heavy roller, because there will then be less snags to deal with. With good fire breaks, burning should be done with a good hot north wind. All springbacks should be cut before burning, this being easier work than cutting and carting them off after the fire. It should be the aim of every man dealing with new land to do everything possible to ensure a good crop. This means a good stubble burn, and this means as much to him as the grain. Three good burns should be sufficient to kill most of the shoots, which is the aim of the man converting a virgin block into a farm." (Secretary, Mr. L. Orloff.)

NETHERTON.

October 8th.—Present: 24 members.

SHEEP IN THE MALLEE.—The following paper was contributed by Mr. A. McLean:—"The statements in this paper are intended to apply to sheep management only as regards the mallee lands east of the Murray. Every farmer should have a few sheep as soon as he can possibly get them; they are a most valuable asset on the farm. Fat lamb raising in this district is out of the question. At present the district is not suitable for the production of fat lambs; we are also too far away from market and freights are too high. Crossbreds of any breed are more difficult to handle than the Merino; they are also more inclined to roam into neighbours' paddocks, especially if he has better feed. Merino wool is the most valuable, and we grow in Australia the best Merino wool in the world, and always commands a good price. The farmer in the mallee districts does not, as a rule, possess good fences, therefore, the Merino being quiet, troubles the fences least of all breeds. The average farmer should secure, in the first place, a number of as good ewes as possible. Cast-for-age ewes from a stud is a very good plan; not more than his farm can carry easily, for overstocking is a very bad practice. Then through a reliable stock firm secure sires, or if he attends a stud sheep sale, ask a friend well up in the knowledge of sheep to select a sire suitable to your requirements, remembering always that our climatic conditions, coupled with the sandy nature of our soil, always creates a tendency towards fineness of wool. It is necessary to secure a robust, strong-woolled sire, then by careful culling, try if possible to have all one class of sheep, so that at shearing time there will not be two or three different classes of wool. The weighty fleece of about 64's quality is the most profitable wool to grow. Early lambs are best, but do not have lambs dropped before there is a reasonable chance of there being some green feed for the mothers. Ewes need careful attention during lambing; also have all lambs dropped within two months if possible. Almost every farmer can tail his own lambs, and the best time to do this is when the lamb is two to three weeks old. You can hardly tail a lamb too young, and it is safe to tail when they are four or five days old."

HARVESTER V. STRIPPER.—Mr. B. Temby read the following paper at the meeting held on November 19th:—"With a harvester one man can reap and clean the wheat in one operation, as against two operations, viz., reap and clean with a winnower. The man with a harvester can then cart his wheat to the market or barn, whereas his neighbor with a stripper has to feed his horses on hay until he cleans the wheat. It also allows the man with a harvester to get his paddocks cleaned out sooner and make use of the feed instead of feeding on hay. On an average crop with much cool weather the extra hay fed to a stripper team would be worth much more than the cocky chaff saved. Another point in favor of the harvester is that one can reap earlier and later than with a stripper, unless perhaps the plant includes a good power winnower, which will then make the stripper outfit much more expensive. Another saving is not having to travel the harvester to a wheat floor, and there is always an element of risk in the wheat heaps becoming damaged by rain. The harvester makes a better sample of wheat, producing less cracked grain, than with a stripper. It also blows out smut and wild oats better than wheat cleaned with a winnower after being reaped with a stripper. An 8ft. harvester costs £200, as against £170 for an 8ft. stripper, plus cost of winnower or the cost of winnowing each year, which would bring the cost of plant at least as high if not higher than a harvester. On 400 acres averaging 12bush. the saving in favor of a harvester would be about £50. The harvester would probably save a fortnight's time in harvesting operations, in which time all the wheat could be carted to market, leaving the man with a stripper his wheat still to cart. The harvester certainly saves no cocky chaff, but when the saving in wages, costs, and feed are gone into, it will be found that the saving of cocky chaff is an expensive item, especially as it is practically useless on its own. The country in this district—especially new land—is probably considered too

rough for a harvester, but I experienced no trouble last season with my machine except that the elevator box was sometimes bent through hitting big stumps. It made a good sample and worked satisfactory. The main items needing attention are to be sure and keep plenty of oil and grease on working parts, belts just tight enough so they will not slip, and keep all nuts and bolts tight." Mr. C. Wilkin also read a paper. (Secretary, Mr. C. Wilkin, Yumali.)

RAMCO.

October 14th.—Present: Eight members.

BUDDING.—Mr. C. Boehm read the following paper:—"Every gardener or fruitgrower should have a knowledge of budding, for often an undesirable tree or plant is discovered, and the best way to treat these is to bud them. If budding is not understood, very often these trees or plants are left for years, which means quite a big loss to the owner, and to engage a man for the job, if there are only one or two trees, may be rather expensive. It is always advisable to bud trees while still young. To bud older trees it is necessary to cut part or all of the tree right back to about 6 in. stubs at pruning time. These stubs produce a mass of young growth. In the spring or early summer—when this growth is about 1 ft. long—it should be thinned out and only those left required for budding in the best positions. Usually, about three or four will be ready for budding in December, preferably just after an irrigation to ensure a full flow of sap. Bud only after a cool change has taken place and so avoid disappointment. For the budding of deciduous trees, select buds from strong water shoots grown on the parent tree, but be sure that they are wood buds and not flower buds. Have a sharp knife, and cut the leaf from the selected bud to a short stub, then cut the bud, starting $\frac{1}{2}$ in. below and finishing $\frac{1}{2}$ in. above, and remove a small chip of wood from inside. Then insert in the "T" slit as quickly as possible and push bud down with the aid of the leaf stub as far as possible. Quickly tie the bud with raffia or bag twine on top first and then down as far as the slit, then wax it all over with grafting wax to exclude all air, and finally wrap some rag around to keep off the direct rays of the sun. In 10 to 14 days it is necessary to loosen all ties, when it will readily be seen if the buds have taken. If so, retie loosely, but there is no need to use wax this time, but the rags must be replaced. This will do for two to three weeks, when all ties can be removed, but if the weather is hot, retie the rags until a cool change takes place, when the rags can be removed. At the next pruning cut back just above the bud. These buds generally grow very rank the following spring, and are often damaged by strong winds in early summer. They require watching, and when about 1 ft. long should be cut back to a bud facing the direction best suited for shaping the tree or to a lateral pointing the desired way. Repeat the shaping as the growth increases. By this method a tree can be better and more quickly shaped than if all the growth is left until the following winter pruning. Citrus trees are budded the same as deciduous trees, only the time of budding differs. For best results I find September and October and again in March and April the best time for inserting citrus buds. The buds should be selected from well rounded wood from near the base of some well grown extended shoot. It is not necessary to take out the little chip of wood from the citrus buds. A good grafting wax can easily and quickly be made at home by taking equal parts of tallow or any fat (unsalted) and beeswax and one quarter part of resin. Melt all together, and when cool will be ready for use." Discussing the paper Mr. Lewis said some years ago a number of trees shot below the bud and were as thick as one's arm before he budded again. He cut back to the main arms, and after they shot he budded, and now they were good trees. He asked whether it was advisable to cut the shoot above the bud, or allow it to go for a time. Mr. C. Boehm said not to cut the shoot. When the bud was growing cut a strip above the bud—cincture, about 2 in. above the bud—and tie the new shoot to it. Mr. J. Boehm asked if it was possible to get success by budding into the older wood on citrus. Mr. C. Boehm said "No"; the bark was too hard. A bud from well-rounded wood near the base was necessary. If one had a large orange tree, bud two or three limbs and let the rest grow. In citrus budding particularly he advised putting wax around. Keeping air away was one of the main points.

A further meeting was held on November 3rd, there being present Mr. J. Boehm (Chair), and eight members. A paper, "Cincturing," was read by Mr. R. Bell. (Secretary, Mr. J. Odgers).

REMARK (Average annual rainfall, 10.52 in.).

Mr. O. Weste presided at the meeting held on October 15th, which was attended by 18 members and 23 visitors. Mr. G. Quinn (Chief Horticultural Instructor) delivered an address, "The Codlin Moth." Mr. Quinn presented to Mr. M. Pethie the trophy for the Vine Section of the River Murray Pruning Competitions. (Secretary, Mr. W. Meier.)

TAPLAN.—Meeting held October 29th. Present: Seven members. Reports of the Forty-first Annual Congress were received and discussed. (Secretary, Mr. P. Hodge, Nangari.)

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

October 9th.—Present: 11 members.

Mr. Pym read an article, "Pasture Management," from the *Journal of Agriculture*.

Meeting held November 5th. Present: 10 members. Numerous questions relating to stock troubles were discussed, and a paper, "Dairy Farming," was read by Mr. H. Paech.

Eight members were present at the meeting held on December 11th. Members discussed matters relating to the Wool Publicity Campaign.

At the meeting held on January 8th, Mr. H. Paech presided over an attendance of 10 members and visitors. A paper from the *Journal of Agriculture*, "The Control of Drift Sand," was read by Mr. R. Talbot.

Meeting held February 5th. Present: eight members and two visitors. The subject, "General Management of Draught Horses," was discussed. (Secretary, Mr. E. Paech, Rockleigh.)

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

Meeting held October 13th. Present: nine members. Mr. W. Goldsack contributed an instructive paper, "American Orchard Practices."

On November 8th eight members of the Branch visited the Crayburn Estate.

A further meeting held on November 10th was attended by 14 members. Mr. B. Fowler (Manager Blackwood Orchard) gave an address, "Codlin Moth Control." (Secretary, Mr. R. Quinn.)

CHERRY GARDENS (Average annual rainfall, 35.03in.).

October 4th.—Present: 14 members.

Members visited the poultry yards of Messrs. Wright and Coles, of Longwood.

On November 1st 11 members and four visitors made a tour of inspection of the district in company with the members of the Mount Compass Branch and Messrs. W. J. Spafford and H. C. Pritchard (Department of Agriculture). Under the guidance of Mr. P. Wise (Secretary of the Mount Barker Branch) the visitors were afforded the opportunity of inspecting the bacon factory of Messrs. W. Jacobs & Sons and the experimental grass plots being conducted by the Waite Research Institute. Other properties visited included Messrs. Bates (dairy farm), L. Cowan and W. McDonald (stud sheep).

The annual social held on November 29th was attended by 16 members and visitors to the number of over 100, including delegates from the Blackwood, Kangarilla, Longwood, McLaren Flat, Scott's Bottom, Clarendon, and Balhannah Branches. Mr. H. N. Wicks (Vice-chairman Advisory Board of Agriculture) addressed the meeting, and musical and elocutionary items were rendered.

The meeting of January 3rd was held at the residence of Mr. M. Basey, and was attended by 11 members. The experiments in manuring fruit trees aroused keen interest. Afternoon tea was provided by Mrs. Basey. (Secretary, Mr. A. Stone.)

GUMERACHA (Average annual rainfall, 33.45in.).

October 10th.—Present: 10 members and two visitors.

An instructive address, "Sheep Breeding," was delivered by Mr. W. Hanna.

On January 5th Mr. W. J. Spafford (Deputy Director of Agriculture) addressed members on the subject "Fertilisers and Manures." There were present 15 members and visitors.

The meeting of February 2nd was held at Mr. A. Cornish's residence, there being present 14 members. Mr. W. Boerth read a paper, "Systematic Farming." (Secretary, Mr. L. Wise.)

HARTLEY (Average annual rainfall, 15in. to 16in.).

September 10th.—Present: 16 members.

"BENEFITS TO BE DERIVED FROM THE AGRICULTURAL BUREAU." The following paper was contributed by Mr. W. Lawton:—"The Agricultural Bureau is largely responsible for the adoption of many up-to-date and scientific methods of farming. Those who become members of a branch should join with the intention of doing something to improve the branch. If members attend meetings regularly and take a live interest in the work they will probably find that some of the other members have mastered problems that they have been trying to overcome. Punctuality and regular attendance should be strictly observed by all members. During busy seasons it is often impossible for members to attend meetings, but during the other portions of the year members should be able to devote one night a month to the Bureau. Not only the individual,

but the district is benefited by the Agricultural Bureau. Each branch, to be a success, should be a live organisation. The Secretary of the branch can do much towards the success of the branch, but he cannot do everything, and it is the duty of members to assist him in every possible way. The younger men especially should be impressed with the advice and help that can be obtained from an active membership. By attending the meetings, they are given an opportunity of hearing the views and experiences of older members, which often enables them to avoid such mistakes as might have been made in the past. To the younger men the Bureau also stands as an education for public speaking. The knowledge of the officers of the Agricultural Department is always at the disposal of members. Any question put to those officers is most willingly answered. The reading of a paper at a meeting may appear a small item, but the discussion that takes place will be of some interest and benefit to all present. The fact that branches are to be found in all progressive districts is sufficient proof of the high esteem in which the Bureau is held by the man on the land."

Twelve members were present at the meeting held on October 9th which took the form of a "Question Box." (Secretary, Mr. D. Harvey, Hartley.)

INMAN VALLEY (Average annual rainfall, 27in.).

October 16th.—Present: Nine members and three visitors.

Mr. R. Gregory gave a report of the proceedings of the Annual Congress.

TOUR OF THE DISTRICT.—On November 13th, 11 members and four visitors made a tour of inspection of several holdings in the district. The first property visited was that of Mr. Nosworthy, who conducted the party over a paddock that he had successfully cleared of scrub. Before clearing, the land would only carry a few sheep; it is now carrying several sheep per acre. The paddocks were sown with Subterranean clover, top dressed, and are now showing a rich growth of clover and natural grasses. Where the scrub was burned off last season it shows a distinct line between top dressed and undressed pasture. Questioned regarding shoots, Mr. Nosworthy stated he had had no difficulty with them, the few left after burning were eaten by the sheep, and the shoots gradually died as a result of the constant eating back. A few might need knocking off: these should never be left until the second year, because they were then harder to kill. Mr. Nosworthy stated that the ti-tree was so dense that he had great difficulty in getting the super spreader through, and now there were only a few bushes left. Next inspected was a paddock of light sandy soil which was once covered with black grass on Mr. Dennis' property. This was ploughed, sown with clover, and top dressed. This pasture has made remarkable first year growth. In some places the super did not quite reach the last round, and the few clover seeds that are trying to grow without the aid of super are very stunted. The party next visited Mr. Stone, who showed a paddock that had been cleared and burnt off. On this he broadcast Perennial rye and Subterranean clover with super, following up with the harrows instead of ploughing. It was noticeable how well the rye grass was growing in any thick deposits of ashes, such places as where logs had been burnt. It would probably pay to scatter rye seed wherever any logs had been burnt. Mr. Kay showed the party over a paddock, on which he had sown clover with oats as a cover crop. This was also scrub land cleared and ploughed. As a first season's growth it was very good, and should be very valuable later on for fattening sheep. (Secretary, Mr. H. Lewis.)

LONGWOOD (Average annual rainfall, 37in. to 38in.).

October 4th.—Present: 10 members and 17 visitors.

QUALIFICATIONS OF THE POULTRY FARMER.—Meeting held at the residence of Mr. J. R. Coles. Members and visitors, including 14 members of the Cherry Gardens Branch, inspected the poultry farm, incubators, brooders, etc. Mr. H. Wright read the following paper:—"It will be noted by those who have had the opportunity of inspecting a number of poultry farms that a progressive man does not confine himself to a rigid set of ideas, but is ever ready to consider and adopt proposals likely to increase his production, or enable him to carry more stock. In the time at his disposal he should endeavor to keep in stride with the progress of time. There is an old saying: Have a cage in which to put your bird before you catch it; and this holds good in poultry farming. The housing then is the first consideration, and one should learn and know a great deal about housing. In times of high wages and high prices for material he should have the ability to erect buildings in the most convenient and economic manner. In a district with a heavy rainfall he will find it advisable to put in good concrete floors, and he will need to pay attention to light and ventilation. He must continually study stock selection. His motto should be: Keep pegging away towards improving the flock, almost daily culling birds as they become backward in production. He will find that scientific breeding is a subject for constant study. Incubator handling requires very close attention and varied treatment during hatching, according to circumstances of climate. Chicken rearing, although very interesting, is at times trying, and keeps one close to his job. Feed wisely, so that the birds are always progressing and healthy.

Best and cleanest foods will work towards this aim and keep down mortality. As his table selections are fattening he must begin early, looking up prospective buyers. It does not pay to keep table birds over time. Birds for table are differently fed to those set aside for egg production. Poultry farming embraces a wide scope in agriculture, and undoubtedly it is an interesting phase of rural activity."

GRASSES.—A paper on this subject was read by Mr. W. Hughes at the meeting held on November 1st, 1930:—"On our small holdings we can produce a great many household requisites, thus cutting out cartage, commission, etc., on those lines. Most landholders in this district can grow all the fruit for dessert cooking, jams, and vegetables for home use if we have sufficient manures, and if we keep a cow or two, some pigs, and poultry they make us fairly independent. But it is not wise to put our hand into our pocket too far for manures or feed for our stock, otherwise we could buy produce instead, and at less cost. Whatever stock we keep, be it a horse, cow, pigs, or poultry, means useful manures, and grass is a big help in feeding such stock. In established paddocks stock can utilise grass from about August to the end of December, and if sufficient is available some can be cut for hay. Barley grass appears after the autumn rains, and on good soil can be cut three or four times until the seed prickles become a nuisance. Prairie grass gives feed almost as soon, and gives a better cut, but not so many, and if grazed stock will eat it out. Rye grasses, rib grass, cocksfoot, and fog each have their advantages and disadvantages. I grow them mixed together. Couch grass is not much good as a feed, spreads rapidly, and is hard to get rid of. Clovers should be represented in the mixture. They grow in undrained swamps where most grasses would perish in winter, and most of them are perennial—last for several years without re-planting. Subterranean is a splendid paddock clover on either hills or swamps. It is good feed from early August to Christmas in average seasons, and, cut in November, makes good hay. It is something of a trouble to cut and cure, and fed green it scours the cows. Give stock dry hay at the same time to check this. Perennial red clover (cow grass) makes a better hay, is more easily cut and cured, and when fed green does not scour so much; but is not so hardy. Under irrigation it will give three good cuts during summer and a lot of feed in each cut. Alsike clover is much like it in growth. Two cuts (under irrigation) can be made, but these are heavier ones than those from cow grass. Cattle eat readily both of these grasses, either green or as hay. Italian crimson is a hardy annual, gives a good body of feed on high land, but cows prefer any of the other clovers to it. For other periods of the year lucerne will give six to seven cuts during summer—not nearly as heavy as clover cuts—under irrigation, but only three cuts without irrigation. Millets, Sudan grass, maize, &c., planted on our high lands in October help us until frosts come, and by planting oats or barley and rye mixed in April we can cut them from July on or leave them until November for hay. With annual crops there is always the expense of ploughing, seed, manure, &c., and risk of failure, whereas the established grass paddock is there for several years. Considering the last year's price of fruits and vegetables, what they cost to produce in labor and manures and to market, and that there seems no reason to expect better this season, I recommend grass paddocks because they are no outlay when once established. The stock manure them. Sheep mean wool and lambs and mutton for the table. Cows mean milk, cream, and butter for the table, and skimmed milk for calves and pigs; both of which help the table and cost very little if plenty of milk and grass is used. Poultry mean eggs and chickens, and a grass paddock helps feed all of these."

A meeting was held on January 31st at Mr. L. Davey's residence. Members report a light apple season. Mr. Davey's cultivation of vegetables under irrigation aroused keen interest. Mr. W. Hughes related his experiences in marketing pigs. (Secretary, Mr. J. E. Coles.)

MOUNT COMPASS.

October 2nd.

Mr. A. Kidman presided over an attendance of 38 members. Several McLaren Flat members also were present. Mr. R. Troit, of the McLaren Flat Branch, gave a lecture on "Motor Cars," in which he gave a resume of motor statistics and traced the development of the industry. Mr. Ingerson, who was Chief Engineer of the British Phosphate Commission in Nauru for 15 years, gave an address, "The Origin of Phosphate and Island Conditions." Delegates reported on the Annual Congress. (Secretary, Mr. J. Black.)

ROCKWOOD.

October 13th.—Present: 11 members and seven visitors.

DAIRYING.—In the course of an address on this subject, Mr. J. Hudd, of the Hartley Branch, said all breeds were good, but advised when once a breed had been selected, to stick to it and try to have a uniform herd. All the cows needed to be well fed and looked after if good returns were expected. A cow could only make milk from the material given her. He gave reports of tested heifers to show the results of careful

breeding on right lines. He advised every man to buy the best breeding stock he could afford, and each time he bought to try and go for something better. In this way he would gradually lift the standard of his stock. He believed in letting the stock have all the salt and other licks they could use. His method was to grow all his own feed, crushing all corn, and he gave the cows 12lbs. chaff and 5lbs. corn as a daily ration.

CONSERVATION OF FODDER AND SEED WHEAT.—Mr. M. Myer read a paper on this subject at the meeting held on November 10th:—"After the lean period experienced during the past three years, farmers might be tempted to dispose of the whole of their produce to secure as much ready cash as possible. They would be well advised, however, to overlook the economic side of the question. For instance, it would be very bad business to sell wheat at milling prices, and then have to turn round and buy seed requirements at from 1s. to 2s. increase on that price. Apart from these aspects, it might not be possible, owing to the very difficult financial position, for the Government to extend the same measure of assistance as it has granted in the past. Where dairying and pig feeding are carried out, the holding back of sufficient grain for feeding the cows is most essential. In spite of the low prices of bacon and butter fat, and the low level of grain prices, there should still be a payable margin left in favor of feeding to animals. The conservation of fodder for use during periods when pastures and crops are dormant, is a sound investment, and particularly so where dairying is carried on. Prior to harvest one should consider the amount of hay that will be required to carry over until the next harvest is available, and it is well to have a good reserve on hand, and in the event of perhaps having a long dry autumn, it may be found necessary to feed the breeding ewes or other stock." (Secretary, Mr. M. Meyer.)

STRATHALBYN (Average annual rainfall, 19.43in.).

Meeting held October 15th. Mr. F. Laycock, Manager of the local Branch of the National Bank, read an instructive paper, "Banking and Finance."

Mr. C. Goddard, of the School of Mines, gave an address, "Wool-classing for the Farmer" at the meeting held on November 18th.

A meeting was also held on November 5th. There was an excellent attendance of members and visitors, including a number of ladies. Dr. C. Wing delivered an address, "Hygiene and the Public Health." (Secretary, Mr. F. Allison.)

TWEEDVALE (Average annual rainfall, 35.96in.).

October 9th.—Present: 26 members and three visitors.

QUESTION BOX.—The following subjects were discussed:—What is the best breed of fowl for this district? *Answer.*—One member stated that the White Leghorn was the best breed in egg production. The Brown Leghorn was not so consistent in egg production. For dual purposes the Black Orpington or Black Minorca were favored. Success in any district was wrapped up in proper housing in cold weather. When is the best time to plant lawn grasses? *Answer.*—September or October. Cuttings should be planted in rows 6in. apart. What is the best feed for young turkeys? *Answer.*—Chopped onions mixed with pollard, also hard boiled eggs, cracked grain, and shell grit. For the first five or six weeks young turkeys should not be allowed to run out in the mornings, because of the danger of the young birds getting wet from running through grass.

APPLE CULTURE.—Mr. R. Hunter, M.P., in the course of an address on this subject at the November 6th meeting, said the best soil for a fruit garden was a hard, firm, heavy soil with ironstone in it. Such soil would produce a good show apple with plenty of color. It was not necessary to cultivate deeply. Selection of trees was of great importance, as a tree which was stunted in its early life would never develop into a vigorous fruit-producing tree. He was in favor of keeping the tree low, as this gave them more vigor and facilitated picking. Fallowing was necessary to give the air a chance to get into the ground. A crop could be successfully grown in an off season if the tree was stripped in a crop year. By not allowing the tree to bear it would retain its vigor, and would produce a crop the following year. A good plan was to strip half the orchard, one would then have a fair crop each year. He did not favor burning the blossoms off with a strong spray during the flowering period. Cultivating and manuring were necessary. In the year that the tree was stripped pruning should not be carried out, but the following year, when the tree was required to produce a crop, it should be pruned. He maintained that through careful pruning one could get more fruit. *Spraying.*—The early January spray for codlin moth was the most important. (Secretary, Mr. B. Schapel.)

URAILLA AND SUMMERTOWN (Average annual rainfall, 44.25in.).

Meeting held October 6th. Present: 12 members and several visitors. Mr. A. Cobbledick delivered an address dealing with his trip to Tasmania to attend the fruitgrowers' conference. (Secretary, Mr. G. Prentice.)

CROWN LANDS.

LANDS TO BE OFFERED SHORTLY.

Lands in the Hundreds of BENARA, COMAUM, GAMBIER, JESSIE, JOANNA, KONGORONG, LAKE GEORGE, MAYURRA, McDONNELL, MOUNT BENSON, NARACORTE, RIVOLI BAY, STIRLING, SYMON, and WATERHOUSE.

When offered full particulars will be published in the *Government Gazette*, and plans and detail may be obtained on application to the Director of Lands, Adelaide.

LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Box 293A, Adelaide.

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.

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All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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S. R. WHITFORD.
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

River Murray, at Renmark, June 18th (Mr. W. E. Meier, Secretary.)

Far West Coast, at Ceduna, July 1st (Mr. E. H. Fear, Secretary.)

Upper North, at Willowie, July 15th (Mr. H. A. Crisp, Secretary.)

The above Conferences will commence at 10.30 a.m. in each case. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

Pruning Competitions.

Pruning competitions in various parts of the State will be held as under:—

River Murray Branches of the Bureau (Mr. J. J. Odgers, Ramco, Secretary).—Mypolonga (date to be fixed); Cadell, June 10th; Waikerie, June 11th; Moorook, June 12th; Berri, June 15th; Renmark, June 16th; championships, at Berri, on June 17th.

Lower North Branches (Mr. J. S. Hammat, Williamstown, Secretary).—Watervale and Penwortham, June 9th; Lyndoch, June 12th; Angaston, June 22nd; Light's Pass, June 24th; Lone Pine, June 29th; Williamstown, July 1st. The championships will be conducted under the auspices of the Lone Pine Branch, and will be held near Tanunda on July 1.

Springton Branch (Mr. E. Brokate, Secretary), June 12th.

The Reynella Competitions will be held on Friday, June 26th.

The Future for Wheat.

Speaking during the discussion which followed the reading of a paper, "Profitable Farming on a Small Holding," by Mr. B. P. Dutschke (Kilkerran), at the Yorke Peninsula Conference, at Maitland, on April 15th, Professor Perkins said it was not for farmers in districts such as those on Yorke Peninsula, where high yields of grain were received, to think of withdrawing from the growing of wheat. No man could be a good farmer who was not an optimist. "If you want to be a pessimist go and live with those in the city! How are you going to live, then, and how are you going to occupy your time?" No man on the land could afford to give up an occupation which it had taken years to master. They hoped that where it was necessary State assistance would be available. Every man on the land was under certain responsibilities. The farmer produced something without which the State could not do, and, recognising their responsibilities, men on the land were not likely to throw up the sponge. He realised that they were receiving prices for their grain which were not economical. But farming was essentially a means of earning a living and profits were always problematic. They could do very well without the luxuries of city life, and indeed were much better off without them. There was not the slightest doubt that prices would rise in the near future, and everyone hoped that it would be by next harvest, and personally he believed that would be so. Present prices were absolutely without equal in the history of the State. Since South Australia had been growing wheat there had been no year when prices had fallen lower than 2s. 3d., and that was in 1893, and in the current year wheat had not averaged over the State more than 2s. Further, with exchange rates at a normal figure, that would be about 1s. 6d. The present low price could not be expected to continue indefinitely. Land would go out of wheat in other countries which could put the land to other and more profitable uses. From 1924 and onwards rye was used extensively in Europe because wheat was too high in price for breadmaking, but with current low prices for wheat, which were actually lower than those of rye, it was only natural that the consumption of wheat should gradually be

restored to normal. There would probably be a reduction in the area sown to wheat, a greater consumption, and the large surplus which had accumulated would gradually disappear. His view regarding the low price for wheat was that this could be largely attributed to the action of the North American Wheat Pools in their vain endeavor to check the normal fall in prices of the post-war boom. He had no personal feelings in this matter. The pools, instead of allowing the price for wheat to take a normal course, held it back and so accumulated huge surplus stocks of grain. These, of course, could not be held indefinitely, and when this point was realised, stocks were released, which resulted in an abnormal fall in prices. But for this he believed that prices to-day would be in the vicinity of 3s. 6d. per bushel. If people tried to handle an article of produce like wheat, which was grown practically all over the world, and endeavored to interfere with its normal circulation, there was the danger that they would do considerable harm to those concerned in its production.

Concluding his remarks, Professor Perkins said, "I hope that you farmers on the Peninsula will try to put in as much wheat as you possibly can. You will have no cause to regret it, and I feel certain that all the assistance that the State can give will be given."

Side Lines on the Farm.

"The main object of side lines on the farm is to support the results of main crops," said Professor A. J. Perkins (Director of Agriculture), in reply to the question, "What is the most profitable side line on the farm at present and what breed would be suggested?" which was submitted by the Kilkerran Branch at the Conference of Yorke Peninsula Branches at Maitland on February 15th. Continuing, the Director said it was unfortunate that in a comparatively short period of time farmers in South Australia appeared to have forgotten the value of side lines, and they had now found that in normal circumstances the farm could not reasonably stand on its own with one type of crop. In the past, when they talked about costs of production, practically the whole of the discussion centred on wheat, but it would be fairer to look as well at the profits earned by the whole of the farm. Looking at the question from a personal point of view, the Director thought that all the various side lines should be availed of to some extent, but in order of preference he would place dairying on a limited scale first. Cows presented the advantage of bringing in a sum of ready money every two weeks. It was not easy to secure good cows, and in that direction they largely had themselves to blame. During the past five years the State had lost 30 per cent. of its dairy cows, because South Australians had considered dairying irksome. In the second place, he recommended poultry, because here again was a source of ready money; and, thirdly, the farmer should consider the raising of fat lambs or the maintenance of a farm flock. In the case of sheep, the revenue was not so regular, and although they might have to pay high prices for cows, sheep could not be handled on an average farm without additional expenditure. Fences, proper subdivision of the farm, and the provision of adequate water supplies were necessary to the successful management of the flock. For the average farm, they could not get away from the well-developed, large-framed Merino ewe, although he recognised that the crossbred ewe would produce a better lamb; but the difficulty was to secure suitable crossbred ewes, and it was a mistake to expect the average farmer to raise his own crossbred ewes. That meant keeping two types of rams, which would frequently lead to a good deal of confusion. The farmer would have to rely on the Merino ewes which could be purchased off shears. With the rams, there was a certain amount of difficulty, and they must consider this question from a national point of view. The type of export lamb was definitely for a well-developed, early maturing lamb, acceptable on the British market, and for this one of the Down types of ram, the dark-faced rams of the British breeds, was essential. Of these the best was the Southdown. Lambs from this cross were not very large at birth, and lambing difficulties would not be serious. Much also could

be said in favor of Dorset Horn. There was not a better type of lamb than the latter for the local market. Crossed with the Merino, it produced a lamb which grew very rapidly and matured early. There was, however, the danger of trouble at lambing time with this cross, because of the shoulder development of the breed. He hoped that farmers would see the desirability of conducting side lines on the farm, in order to make the growing of wheat a less precarious occupation than it was at the present time.

The World's Barley Crop.

In a recent statement regarding the world's barley crop, the Ministry of Agriculture (England) reported that the crop of 1930-31, although somewhat smaller in total to that of 1929-30, had again been well over the average, the latest estimates indicating a total production (apart from Russia) of 618 million cwts. against 643 million cwts. in 1929-30, and the five-year average of 534 million cwts. In the United States and Canada the combined crop of 199 million cwts. exceeded that of the previous year by 25 million cwts. The European crop, however, at 321 million cwts. showed a reduction on the year of 9 per cent., although for the most part harvests were above the average, while in North Africa and Argentina yields were generally below average. Although the European crop in total was distinctly smaller than in the preceding season, harvest results in the exporting countries in the south-east were generally good. In consequence the export movement from that area had been maintained at last season's level, while in addition there had been a material increase from Russia. Shipments from other sources, however, had generally declined. Imports into the United Kingdom at 12 million cwts. in the seven months ended February, 1931, had been about 3½ million cwts. larger than in the corresponding period of last season, but the increase did not entirely compensate for the reduction of 5 million cwts. in the home crop. During the current season the largest individual source of supply had been Russia with 4,800,000cwts. against about 400,000cwts. only in the seven months ended February, 1930. Roumania had supplied 2,100,000cwts., an increase of 600,000cwts., but imports from the United States and Canada had together fallen by over 1 million cwts. to 2½ million cwts.

Essays in Agricultural Economy.

In order to commemorate the marriage of Prince Humbert of Italy and Princess Marie Jose of Belgium, the International Institute of Agriculture, Rome, has instituted the "Humbert-Marie Jose" annual prize for the best work on agricultural economy. The prize will consist of a gold medal and the sum of 10,000 lira (£108 in London, par), and entries must be submitted before September 30th. Only the works of authors who are nationals of countries adhering to the Institute and which have been published in the course of the two preceding years shall be eligible for competition. A set of regulations governing the competition and the manner in which works on the subject should be forwarded may be seen at the office of the Minister of Agriculture, Adelaide.

Handling of Citrus Fruit for Export. A Correction.

In commenting on the recommendations of the Citrus Preservation Committee of the Council for Scientific and Industrial Research, published on page 906 of our April issue, Mr. Geo. Quinn (Chief Horticultural Instructor) has pointed out that the dimensions of the export citrus case were wrongly given by the Committee. The report stated, "Only export citrus cases (23 x 11½ x 11½ inside measurements clear of a division) should be used," &c. This should have been "Only export citrus cases (24 x 11½ x 11½ inside measurement) should be used," &c. The Chairman of the Committee has also written asking us to draw attention to the error in the report.

Shearing Three Times in Two Years.

Is it payable to shear sheep every nine months and three times in two years? (Taragoro Agricultural Bureau). Mr. A. H. Codrington (Wool Instructor, School of Mines) supplied the following reply:—

"Should the wool of 12 months' growth be typed, suitable for the English system of combing, it almost invariably follows that wool of nine months, owing to its

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[PATON]

shortness of length, would be appreciably affected in type and spinning quality, resulting in the clean scoured value being lowered to correspond with the changed degree of type; hence, the price for nine months' wool would probably be from 1d. to 1½d. per lb. less than that paid for 12 months' growth. It is possible, however, that three shearings in two years would yield a slight increase in the total weight of wool per sheep, but against this advantage must be debited the cost of third shearing.

"Assuming, then, that there is no difference in price of wools per pound, sheep would have to yield at least 12½ per cent. more wool per head over two years at present prices, to show the slightest advantage, after allowing for the cost of the extra shearing. In this explanation, any possible natural advantage or disadvantage that might be associated with such a venture has not been taken into account."

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

"The Demand for Canned Fruits." Empire Marketing Board. Report No. 37. Price 1s. net.

"Farm Booklet for 1931-32." Messrs. F. H. Brunning Pty. Ltd., Melbourne.

Annual Report, 1929, Department of Agriculture, Ontario, Canada.

Year Book, 1929, Department of Agriculture, Gold Coast.

Annual Report, 1930, Department of Agriculture, New Brunswick.

University of Adelaide. Manual of Public Examinations Board, 1931.

AGRICULTURAL INQUIRIES.

[Replies supplied by PROF. A. J. PERKINS, Director of Agriculture.]

Barley on Stubble Land.

"Which is of greater advantage for the production of barley, to work stubble land wet or dry and with the cultivator or plough?" Maitland Conference. There are two points to this question. So far as the moisture content of the soil is concerned barley is not greatly affected. Much depends on the type of soil on which the crop is to be produced, either grass land or stubble. Grass land will not be so satisfactory as stubble land, because barley should not be grown on land too high in fertility. On stubble land on Yorke Peninsula the Director thought it would be immaterial whether the soil was broken up either wet or dry, provided they could work it down late in the season. If the land was of a heavy nature, it would be necessary to wait until sufficient rain was received to enable the implements to deal with it. On light land, the cultivator would be all that was necessary for barley sown on stubble produced on good fallow of the previous year. The plough would be needed to deal with heavy land.

Barley Growing on Stubble Land Without Super.

"Can a profitable crop of barley be expected on wheat stubble without super?" Maitland Conference. The reply to this question depends whether it refers to land that has been treated for a number of years or not. Most of the land on Yorke Peninsula has been dressed very consistently with super for many years. If, for instance, they had land that had carried crops for 20 years and the crop had been treated with a 1 cwt. application of 36 per cent. super, it would mean that the land had received 1 ton of super in that period. From that there would certainly be a big residual amount of phosphate left. In the case of those farmers in straitened circumstances, it would not be necessary to use super on old land. Barley did not need a very fertile soil. If, on the other hand, they had to deal with land that had not been cultivated for a number of years, it would be preferable to give a light dressing of super, say, 45 lbs. to the acre.

[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

100 Per Cent. Superphosphate.

"How does 100 per cent. super compare with lower grades when freighted 120 miles on the railways?" ("M. C. C.," Yurgo). Reply—All superphosphates, i.e., all water-soluble phosphates on our market contain the same fertilising constituent, namely, phosphorus combined up as mono-calcic phosphate, and so are strictly comparable as to price and effectiveness. One ton of 100 per cent. superphosphate contains the equivalent of 2,240lbs. tricalcic phosphate; 2.08 tons of 48 per cent. superphosphate contain the equivalent of 2,240lbs. tricalcic phosphate; 2.22 tons of 45 per cent. superphosphate contain the equivalent of 2,240lbs. tricalcic phosphate.

1 ton of 100 per cent. superphosphate, at £11 5s. = £11 5s.

2.08 tons of 48 per cent. super, at £5 = £10 8s.

2.22 tons of 45 per cent. super, at £5 15s. = £10 10s. 11d.

120 miles railway freight, 11s. 2d. per ton for superphosphate; tarpaulin, 2s. 8d. per truck.

	1 ton 100% superphosphate. £	2.08 tons 48% superphosphate. £	2.22 tons 45% superphosphate. £
Cost of manure	11 5 0	10 8 0	10 10 11
Freight (120 miles)	0 11 2	1 3 3	1 4 9
Tarpaulin	0 0 4	0 0 8	0 0 8
Cost at siding	£11 16 6	£11 11 11	£11 16 4

These figures show that at railway sidings 120 miles from the place of manufacture, amounts of 100 per cent. and 45 per cent. superphosphate, containing the same quantity of phosphate of lime, cost almost exactly the same figure, whereas 48 per cent. superphosphate is cheaper. There is, however, much less material to handle where 100 per cent. superphosphate is being used; but, on the other hand, the distribution of the lower grade of superphosphate is always more regular than where smaller weights of higher grade are drilled in.

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POULTRY INQUIRIES.

[Replies supplied by Mr. C. F. ANDERSON, Government Poultry Expert.]

Profits from Poultry.

"What would be the approximate profit in a year from 200 White Leghorn hens at the present price of foodstuffs, calculating the price on the past year for infertile eggs?" (Maitland Conference). Reply—The approximate profit from 200 White Leghorn hens depends on a number of circumstances, the principal of which are—

1. The period of hatching.
2. The method of feeding.
3. Whether good laying strain stock or not is kept.

In dealing with the period of hatching, it is necessary for profitable egg production that a percentage of winter egg production should be obtained when egg prices are at their highest. In order to do this, I recommend for the Peninsula districts White Leghorns, hatched during August and September.

The method of feeding to be recommended is:—Morning: Wet mash, composed of 1 part bran, 2 parts pollard, 1lb. meat meal per 100 birds; in summer months 60 per cent. green feed, and 40 per cent. green feed in winter months. Crushed wheat can be substituted for the pollard. The average quantities to be fed per bird daily is bran $\frac{1}{2}$ oz., pollard or crushed wheat 1oz. Wheat at midday and night at the rate of 2ozs. per bird per day.

The class of stock is also an important factor. Some classes of stock will produce only 7 dozen or 8 dozen eggs per year, while others will produce 15 dozen to 16 dozen per year. The size of the egg must also be considered. Some strains of poultry lay a large percentage of small eggs. The aim should be to select a strain that will average on the farm from 12 dozen to 13 dozen eggs per year of an average weight of 2ozs. per egg.

Assuming that the above essentials have been closely followed, a flock of 200 White Leghorn hens laying an average of 12 $\frac{1}{2}$ dozen eggs per year would produce 2,500 dozen eggs per year. Basing the average net return to the producer of guaranteed new-laid infertile eggs at 10d. per dozen, the return for the 2,500 dozen would be £104 3s. 4d.

Each bird would consume 1 $\frac{1}{2}$ bush. of wheat per year, and basing wheat at 2s. per bushel on the farm, the feeding cost would be 3s. Add another 1s. per bird for cost of greenfeed, meatmeal, shell grit, &c., making a total of 4s. per bird, or £40 per year for 200 birds. The value of eggs produced by the 200 hens would be £104 3s. 4d., less £40 as cost of feeding, leaving a net return of £64 3s. 4d. to the producer.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"E. E. R.," Narridy, has mare with evil smelling discharge from left nostril. There is no evidence of the mare having a cold. Reply—The trouble is due to either a piece of decayed bone in the back of the nostrils, or to an infection of the sinuses of the head. The latter condition may arise as a sequel to a previously occurring cold, or be due to some teething trouble (such as a decayed tooth). The only treatment you can give is repeated inhalations of medicated steam. This may to some extent help to alleviate the condition, but a cure is only likely to result if you can have the animal surgically treated by a qualified veterinary surgeon.

Secretary, Agricultural Bureau, Weavers, reports—(1) Heifer calf gone practically blind. (2) Heifer with ulcers around top of teats. (3) Pigs very weak in legs. Replies—(1) During the last three years a number of similar reports have been received. The

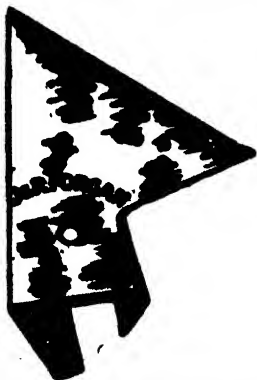
cause is unknown, but thought to be due to the absence of certain substances (vitamins) in the food supplied. There is no treatment which as yet has proved effective, but you may try administering once a day with the milk two tablespoonfuls of cod liver oil. (2) Clip the hair from adjoining skin, and after each milking apply a little of the following mixture with a camel hair brush, first drying the teats:—Take tincture of iodine, Friars balsam, glycerine, equal parts. The condition is most probably caused by leaving the teats wet after milking. Concentrates should be fed at the rate of 3lbs. of concentrates mixed with chaff for every gallon of milk produced by the animal. (3) Apparently there is a lack of minerals in the feed mixture supplied, which latter is especially necessary in growing animals. In the milk give cod liver oil at the rate of a teaspoonful for each pig once daily and feed the grain crushed and dry. Mix with each 100lbs. of crushed grain 1lb. of ground rock phosphate. If you have a plot of lucerne a small bundle once a day should be given.

"A. S. T.," *Bowhill*, reports—(1) *Horse with lumps on the shoulder and knee.* Replies—(1) *Lump on shoulder.*—This is due to the formation of what is termed a "cold abscess," which is slow in development and not accompanied by symptoms of acute pain or much heat. The treatment indicated is to hasten the "pointing" of the abscess by application of hot water to the part twice a day and then opening at the lowest point with the point of a sharp penknife to allow evacuation of pus (matter) and to allow efficient drainage. Sometimes a blister is applied to the swelling with the same object of causing it to point, but heat in the form of hot fomentations is best. Owing to the thick wall which surrounds the abscess a complete cure can often only be obtained by a radical operation under chloroform, which would have to be carried out by a veterinary surgeon. (2) *Lump on knee.*—From description supplied, it would appear that a fracture of some of the bones has occurred at some time, and in healing the main joint of the knee (hinge joint) has become knit. The only treatment is the application of a blister to front of the knee and rest.

Secretary, Agricultural Bureau, Springton, reports a heifer with diarrhoea and swelling of cheeks. Reply—Swelling of the cheeks is indicative of debility which has

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in the first place been caused by the diarrhoea. Treatment—Commence by giving the animal the following drench:—Raw linseed oil, 1 pint. Twenty-four hours later give the following mixture:—Prepared chalk, 4ozs.; tincture opii, 5ozs.; tincture catechu, 5ozs.; spirits of chloroform, 5oz.; water, add 1 pint. Make mixture. Directions—Give 2 wineglassfuls three times a day in 1 pint of flour gruel. Keep the animal in a stall and feed on good quality chaff with a little pollard and crushed grain added. A sample of the animal's manure will be examined if forwarded.

"J. B.," *Ramoo*, asks for treatment to keep flies off cows and horses. Reply—There is no application for this purpose that can be applied to the animal's skin with any lasting effects, and it is therefore necessary to re-apply these frequently at intervals. The following applications are stated to be as effective as any:—(a) 1 part fresh Laurel oil, 10 parts linseed oil. (b) 1 part fresh Laurel oil, 4 parts diluted spirits, 5 parts olive oil.

"K. M.," *Mount Gambier*, asks what action mustard has when incorporated with drenches for sheep worms. Reply—The administration of mustard along with copper sulphate to sheep for internal parasites is recommended by the Department of Agriculture, New South Wales, on the grounds that the stimulant and carminative properties of the mustard offsets certain astringent and antiferment properties of the copper sulphate solution on the alimentary canal. Experimental evidence indicates that the mustard itself has little or no specific action as a vermifuge.

Secretary, Agricultural Bureau, Brentwood, reports death of ewes in good condition and carrying twin lambs, unable to stand for two days prior to death. No other symptoms in evidence. Reply—The mortality is due to a condition known as "Toxaemia of pregnancy" which only affects ewes in good condition and during the last five weeks of pregnancy. The malady is always associated with good condition and lack of exercise. No medicine has proved successful as a curative agent, though the administration of treacle or molasses (two tablespoonfuls in a cup of water) may be tried. The condition may be prevented by keeping pregnant ewes in just good store condition and making them exercise. This can be done readily by placing them in a paddock containing not too much grass, &c., so that they have to exercise to get a bellyful. If feed is plentiful in paddocks, put them on to the fallow or exercise them daily. Any hand feeding should be kept over until after they have dropped their lambs.

"J. M. C.," *Waikerie*, reports horse with swollen penis. Reply—Draw penis out from sheath and wash thoroughly with hot water and soap. Clean up sores. Dry area and apply carbolic vaseline over penis and sheath. Dress sores daily with the vaseline. If no improvement, syringe sheath out daily with a 2 per cent. solution of zinc sulphate.

"V. E. W.," *Millendilla*, has horse listless, dull, and falling away in condition. Reply—Try the following treatment:—Give this drench—Raw linseed oil, 1½ pints; spirits of aromatic ammonia, 1oz.; spirits of nitrous aether, 1oz. The following day commence giving Fowler's solution of arsenic twice a day for 14 days, the dose being 1 tablespoonful in a little chaff and bran, or direct into the mouth. The amount of solution required for the course of treatment is a 1lb. bottle. Report progress at the end of treatment.

Hon. Secretary, Agricultural Bureau, Rendelsham, reports—(1) Horse continually trying to pass water, and turns head around towards stomach. (2) Cow with "tucked up" appearance and hunched back, falling away in condition. Reply—(1) The horse has sub-acute colic, and the following treatment is suggested:—A drench of raw linseed oil, 1½ pints; turpentine, 4 tablespoonfuls. Enemas of warm soapy water every three hours. Further, give a teaspoonful of powdered nux vomica three times daily (to give—mix with treacle and smear on the tongue). (2) The following treatment is advised—give the following drench:—Epsom salts, 1½lbs.; ginger, 4 tablespoonfuls; treacle, 1 cupful; warm water, 2 pints. Subsequently give a teaspoonful of powdered nux vomica night and morning (as above) for 10 days. Further, feed on good quality chaff and bran, and give 1lb. of linseed meal daily. Give green feed, if available, and also a handful of sterilised sweet ground bonemeal mixed in the damped feed three times weekly.

TOBACCO CULTURE.

[By R. C. SCOTT, Supervisor of Experimental Work, and S. B. OPIE, Field Officer.]

The area under tobacco in Australia has fluctuated very considerably during the 75 years in which this crop has been cultivated. During the Civil War in America, when leaf imports into the Commonwealth were greatly restricted, the area under crop rapidly increased, and in 1888-89 almost 7,000 acres were devoted to tobacco. However, this condition has not been maintained, and of recent years the area planted has varied from one to three thousand acres. The reason for this decline is that the public taste has changed from the heavier smoking tobaccos to the light smoking type suitable for cigarettes and mild smoking pipe tobaccos. In order to meet this demand, manufacturers have had to secure light leaf and discourage the production of dark, air-cured leaf which hitherto was in demand. Accordingly, in 1919 an ultimatum was issued to the growers by manufacturers intimating that they were no longer prepared to purchase unlimited quantities of this class of tobacco. They recommended growers to aim at the production of light, fine-textured leaf, and to cure the leaf under controlled temperature in proper barns erected for the purpose.

From that time the whole character of the industry in Australia changed, and to-day it is essential that light colored, mild smoking flue-cured tobacco must be produced in order to become saleable. That there is ample room for expansion in this industry provided that quality leaf is secured is indicated by the following figures showing the production and consumption of tobacco in Australia for the year 1928-29. In this year the tobacco imported into the Commonwealth amounted to 23,072,691lbs., whilst that produced totalled only 1,808,160lbs. The relative figures for other seasons are practically the same, showing that Australia only produces from 8 to 10 per cent of its requirements for tobacco. There is little doubt that Australian leaf possesses characteristic flavors and aromas, but it can be confidently claimed that these are not objectionable. Certainly they are not acceptable to every smoker, but no more so than various brands of imported tobaccos. It is therefore a matter of individual taste. Other things being equal, the average smoker will not be dictated to as regards taste.

However, price is the most important factor in determining the popularity of a tobacco, and the position to-day is that Australian tobacco possesses an advantage over imported tobaccos in this respect. Further, within recent months the financial position has compelled smokers to economise and adopt brands containing locally grown leaf. In the majority of cases they have quickly acquired a liking for the characteristic flavors of this leaf and an appreciation of the quality. This augurs well for the future, and there is every reason to anticipate rapid and successful development of the tobacco industry in Australia.

HISTORY OF THE CROP IN SOUTH AUSTRALIA.

Many of the older residents can recall the cultivation of tobacco by Chinese some 30 to 40 years ago, but it was not until about 1920 that the production of bright tobacco was attempted in this State. Following a visit from Mr. Temple A. J. Smith, Tobacco Expert in Victoria, who expressed the opinion that certain districts should be able to produce leaf of the necessary quality, a number of experimental plots were planted during the season 1920-21. These plots extended from Williamstown to Ashbourne in the Adelaide Hills, and also in the Inman Valley. The results obtained were rather encouraging, the best crop being that raised by Mr. W. E. Daddow at Mount Barker. The yields and prices secured aroused interest in the possibilities of tobacco in this State, and in succeeding years other landowners took up the cultivation of the crop. However, the expansion has not been rapid, because of the high values obtained for

other forms of agricultural produce, the necessity for experience in handling the crop, the need for special curing barns, and the irregularity of our summer rainfall. However, consequent upon the fall in price of other agricultural products, the possibilities of tobacco growing is commanding attention at the present time, and larger areas will be planted in future years.

The following table indicates the area of tobacco planted in South Australia since 1920:—

Year.	Area. Acres.
1920-21	1
1921-22	1
1922-23	1
1923-24	10
1924-25	36
1925-26	11
1926-27	27
1927-28	17
1928-29	14
1929-30	37
1930-31	80 (estimated)



Crop of Tobacco.

PROSPECTS OF THE CROP IN SOUTH AUSTRALIA.

In the succeeding pages the requirements for successful tobacco cultivation are indicated.

It would appear that there are considerable areas in this State which answer the natural requirements, the only doubt being whether we have a sufficiently regular and adequate summer rainfall. However, in many localities this disadvantage can be overcome by the provision of irrigation water, thus ensuring regular crops independently of the rainfall recorded. Given intelligent application of the principles governing the production of light flue-cured tobacco, followed by the improvement in methods which will be gained as the result of added experience, it can be confidently predicted that tobacco culture will become an important and profitable crop in South Australia.

Emphasis must be placed on the fact that every prospective grower must be prepared to give full attention to the crop if maximum prices and good quality leaf are expected.

NATURAL REQUIREMENTS FOR THE PRODUCTION OF BRIGHT, FLUE-CURED LEAF.

Soils.—The character of the soil has the greatest influence on the production of the lighter and brighter types of tobacco. It is generally accepted that if this class of leaf is to be secured, rich soil must be discarded in favor of light, sandy soil.

Tobacco will grow on a great variety of soils, but as the grower must supply the manufacturer with the type of leaf required by the consumer, it follows that as the demand to-day is for a light smoking tobacco, the producer must plant his crop on land of such character as to yield leaf of the necessary quality. Soils which are very retentive of moisture or in a high state of fertility, tend to produce dark, heavy leaf of comparatively high nicotine content. Such leaf is not required by the manufacturer. The soil suited for the production of bright tobacco is of a sandy nature, naturally well drained and overlying a good subsoil, preferably yellowish in color.

To counteract the effect of water-logging after heavy rain, the sand should be fairly deep, a depth of approximately one foot being desirable.

Typical tobacco soils of South Australia were examined by Mr. E. P. Bainbridge, Assistant, Australian Tobacco Investigation. His description and mechanical analyses of the land at that time under crop were as follows:—

“The soil used for tobacco is apparently derived from a fine grained ferruginous sandstone. The country is hilly, and the land used mainly is on the gentler slopes and in the valleys. The soil is mainly a very fine sandy loam, light grey or white in color, and 9in. to 18in. deep overlying a yellow or red sandy clay. In places there is a large amount of ironstone and quartz concretions in the soil. Sometimes these appear on the surface, but often they are in a definite layer in the soil. The clay is free or almost free from them.”

Depth of Sample :—	Mount Barker.			Macclesfield.		
	0-8"	8-12"	12-27"	0-9"	9-18"	18-27"
Reaction pH.	5.8	6.7	6.0	4.9	6.2	6.6
Fine gravel	1.0	6.3	0.6	0.1	—	—
Coarse sand	6.7	7.0	1.2	12.0	7.8	10.7
Fine sand	67.9	63.7	11.2	53.8	42.1	42.6
Silt	11.6	12.8	3.1	16.6	10.1	10.2
Fine silt	5.0	4.2	7.9	7.9	4.7	5.2
Clay	2.2	2.7	59.2	4.2	28.2	24.7
Loss on acid treatment ...	0.5	0.5	1.2	0.5	0.5	0.4
Loss on ignition	2.4	1.7	10.3	2.4	4.4	3.9
Moisture	0.5	0.5	6.3	0.6	2.6	2.3

Situation.—As a rule the higher and moister areas provide the best conditions for ripening leaf, whilst the dryer districts, even when the plants are adequately supplied with irrigation water, do not tend to produce leaf of the same quality or aroma.

In the view of some, sea air has an injurious effect on flavor, and it is sometimes advocated that tobacco should not be grown in close proximity to the sea. On the other hand, in some countries of the world first class leaf is produced when grown close to the waters' edge. It would appear, therefore, that whilst sea air may have a bad influence on flavor, it is not likely to be a serious objection except perhaps where the arrangement of hills or cliffs subject the crop to frequent salt-laden winds.

Climate.—Climate is the factor affecting the flavor of tobacco leaf. For best results the crop should grow regularly and fairly quickly. Any check in development, such as may be caused by a comparatively long, dry period, or by cool weather, will tend to affect quality. Whilst tobacco thrives under moist soil conditions, it quickly suffers in the presence of excess water. If we could be sure of regular precipitations there are a number of areas in this State with sufficient rainfall for the cultivation of tobacco. However, experience has shown that rains during the growing period of the crop: that is to say, during the summer months of the year, are often received in heavy falls, with a space of some weeks intervening between one soaking and the next. Such distribution is not in favor of quality leaf, and we must face the fact that for regular yields and the

production of light, bright tobacco, a supply of irrigation water would be of very great assistance. Any new grower should endeavor to commence operations in areas where irrigation could be applied if the necessity arose. In a general way, it may be said that any district receiving an average fall of from 40 points to 50 points per week during the growing period of the crop offers possibilities for tobacco cultivation. This amount, however, is considerably less than that obtaining in other tobacco producing countries, where it approaches an average of approximately one inch per week.

At Mount Barker the mean summer rainfall recorded over the past 69 years is as follows:—

October	281	points
November	156	“
December	132	“
January	102	“
February	94	“
<hr/>		
Total	765	“



Tobacco Plant Showing Typical Leaf Growth.

With regular distribution this may be regarded as a very satisfactory rainfall for tobacco, and the prospects of successful cultivation without having to resort to irrigation will vary according to whether that recorded for any season is above or below the figures quoted. In the same way those districts enjoying a higher rainfall than Mount Barker possess an advantage in this respect. However, as has been pointed out, our difficulty is the irregularity of distribution rather than the lack of total quantity. This renders means to irrigate an insurance against comparative failure.

Frosts are liable to cause considerable damage, more particularly early autumn frosts before the leaf has been harvested. Tobacco is more resistant to attack than such crops as potatoes, maize, or tomatoes, and is rarely seriously affected by late spring frosts. However, low temperatures experienced during February, March, or early April may ruin matured leaves. It follows, therefore, that districts and fields must be chosen which are reasonably free from frosts in late summer or early autumn.

It is easy to realise that tobacco leaves may be considerably damaged by the action of wind. A sheltered position should always be sought, and if this is not possible, wind-breaks should be provided by planting rows of maize at right angles to the direction of the prevailing wind or the erection of brush fences.

DESCRIPTION OF THE PLANT.

In tropical countries the tobacco plant is a perennial, but in the more temperate parts of the world many plants are killed by frost and the cold wet weather of winter, with the result that it usually becomes an annual so far as commercial leaf production is concerned.

The species commonly grown is *Nicotiana tabacum*. This type grows from 2ft. to 9ft. in height, with spreading leaves varying in shape from ovate to lanceolate according to the variety. The leaves are arranged spirally round the central stem, the distance apart on the stalk varying considerably, but usually about 2in. The flowers are held in clusters, the corollas being bell-shaped, about 2in. long, and reddish to pinkish-white in color. Another species introduced into South Australia for trial is *Nicotiana rustica*. It is a hardy type, with ovate leaves on long stems, and with greenish-yellow flowers. The Turkish tobacco is probably of this species. However, it does not appear likely to prove of commercial value in Australia.

VARIETIES.

Botanically the varieties being grown in Australia belong to the species *Nicotiana tabacum*. They may be divided into two types, namely, Broad-leafed Virginian and Burley. Both of these are suitable for the manufacture of light plug and cigarette tobacco. The Virginian type is the more popular. It suits the majority of our tobacco soils, and is fairly hardy. It is usually flue-cured.

The Burley type when grown in other parts of the world is largely air-cured. It is used for the production of characteristic brands of tobacco such as Temple Bar, Edgeworth, &c. It possesses the advantage of producing good colored leaf even when grown on heavy and more fertile soils. Whilst not largely grown as yet, it appears to us to be a valuable type for many of our South Australian soils, and one which every grower should test on his class of tobacco land.

Amongst the best Virginian varieties are:—

Warne.—Probably the most widely grown in this State, and suited to the lighter soils.

White Stem Orinoco. } Good varieties which yield bright, fine quality leaf when
Little Orinoco. } grown on medium to light class land.

Hickory Prior.—A good quality tobacco for soils slightly heavier in type.

Numerous other varieties have been tested, and the following may be listed as being satisfactory:—Adeock, Broad Leaf Gooch, Big Orinoco, Cash, Conqueror, Dungowan, Gold Leaf, Hester, Jamaica, Lacks, Long Leaf Gooch, Spotted Gum, Yellow Orinoco, Yellow Prior.

Burley tobaccos of promise are:—Judy's Pride, Standing Resistant, Station Stand Up, Vimond Kelly, and Kelly.

These varieties are suited to the richer soils or land containing more clay than that recommended for Virginian tobaccos. They color up well in the field, but are rather susceptible to disease and insect attack.

Within recent years the Department has introduced a number of varieties from the more temperate countries of the world, in the hope of obtaining a type better suited to local climatic conditions. These have not been tested for sufficient length of time to be able to make a definite statement regarding their value, but a limited number show promise of yielding good quality leaf.

POSITION OF TOBACCO IN ROTATION.

Tobacco is not a particularly exhausting crop, and provided it is adequately manured, may be continuously grown on the same piece of land until disease, pests, or fouling renders a change of crop necessary. Continuous cropping is largely adopted in some countries, but is not to be recommended for our conditions. At times a second or even a third crop may be removed from the same piece of land in successive seasons, without danger, but if possible a rotation should always be planned.

Tobacco does not follow potatoes with advantage, because this crop tends to deplete the land of potash, an important plant food for tobacco. It should preferably be preceded by a leguminous crop in order that the soil be well supplied with humus, but in such case it is essential that all organic matter be ploughed under several weeks before planting, and so become thoroughly decomposed.

In our Adelaide Hills districts it is recommended that the tobacco crop should be followed by Subterranean clover and left down to pasture for at least one season.



Departmental Experimental Area, Mount Barker.

PREPARATION OF THE FIELD.

Tobacco does not thrive in a sour soil, and therefore the field selected should preferably have been cleared and under cultivation for some time.

If new land recently reclaimed from timbered conditions is to be utilised, it should be prepared some months before planting in order to allow the soil to sweeten. If possible, however, new land should carry some other class of crop before being planted with tobacco. Tobacco is a summer-growing crop, and as our summer rainfall is limited and irregular, it follows that every endeavor should be made to place the soil in such condition that it will absorb and retain the maximum amount of winter rainfall.

If there is little danger of the land washing, it should be ploughed on a fairly deep furrow, in late autumn or early winter. In many districts, however, this is not advisable, and ploughing must be postponed until early spring. The first ploughing should be relatively deep, 8in. to 9in., followed by a second shallower working later in the

season, and sometimes a third shortly before planting. According to the soil requirements the land should be cultivated, rolled, and harrowed, so that moisture is retained and weeds kept in check. At transplanting, the surface should be in a fine, free condition, and the under layers well compacted.

MANURES AND MANURING.

Tobacco needs to be liberally but judiciously fertilised, as excess food, particularly nitrogenous, affects the quality of the leaf. The manurial requirements of tobacco can be indicated in a general way, but the actual amounts which it is economic to apply can only be determined by field experiment, and will vary within fairly wide limits. The most important plant foods are nitrogen, phosphoric acid, and potash. Lime may be included as an important soil amendment, as tobacco does not make good growth in sour soils. An application of this material is necessary to improve such lands. On the other hand, fertilisers containing chlorine are to be avoided, as according to the majority of experiments this substance affects the burning quality of the leaf. Most local soils are well stocked with available nitrogen, fairly well supplied with potash, but markedly deficient in phosphoric acid. However, tobacco needs abundant supplies of readily available foodstuffs, and therefore, notwithstanding the presence of nitrogen and potash, most tobacco manures include limited quantities of these two substances. Phosphoric acid, apart from its action as a plant food, encourages root development, thus rendering the plants more drought resistant. It hastens maturity, which allows the crop to ripen in good weather and yield good coloured leaf. Nitrogen is a relatively dangerous fertiliser for tobacco, since when present in excess it delays ripening, causes dark green fleshy leaves, which cure out to dark colored, coarse-textured tobacco of high nicotine content. Potash improves the texture of the leaf and promotes good burning qualities. Muriate of potash or kainit should not be utilised, because of the chlorine they contain. Lime is necessary for sour or acid land. When used in the form of air-slaked lime or crushed limestone, a dressing of at least 1 ton to the acre is required. This quantity should be spread over the surface of the ploughed land and harrowed in.

The fertilisers phosphoric acid, nitrogen, and potash are available from manufacturers in the form of a complete fertiliser. The percentages of each will vary according to the purpose for which it is intended, and for tobacco the combination may include:—

- 8 to 12 per cent. phosphoric acid
- 3 to 6 per cent. nitrogen
- 2 to 6 per cent. potash.

The phosphoric acid is usually present as superphosphate, the nitrogen as nitrate of soda, sulphate of ammonia, or dried blood, and potash as sulphate of potash.

A complete fertiliser on the market in this State, and recommended for use in applications of from 7cwts. to 10cwts. per acre, has the following analysis:—

- 8 per cent. phosphoric acid (17½ per cent. water soluble phosphate)
- 2 per cent. nitrogen
- 5 per cent. potash.

APPLICATION OF FERTILISER.

Comparatively heavy dressings of manure must be given to tobacco to have appreciable effect. The methods of application vary. The fertiliser may be broadcast or drilled over the area shortly before planting; applied at the same time as the young plants by means of the transplanting machine, or spread around the base of each seedling. A combination of these methods is recommended, namely, about two-thirds of the manure to be drilled or broadcast immediately after the last ploughing. About half the balance applied at planting time, either by hand or machine, and the balance to which additional nitrogenous manure has been added spread around the seedlings about two to three weeks after planting. This last fertilisation is usually at the rate

of $\frac{1}{2}$ oz. to 1 oz. of manure per plant. If a planting machine is not available for distributing the fertiliser with the plants, a drill may be utilised by sowing the manure through two hoes only and blocking the intervening space of three to four hoes between each pair. The optimum manurial dressing will need to be ascertained by experiment. On the average, 10 cwt. of superphosphate if used alone, or about 8 cwt. of complete fertiliser per acre will not prove excessive.

SEEDBEDS.

Tobacco seed is extremely small, and it is therefore necessary to raise the seedlings in nursery beds, and later transplant in the field. The raising of the tobacco plants is one of the most important operations in the cultivation of this crop, and for this reason is given in some detail. It is easy to realise that at transplanting time the grower must have available an ample supply of strong, healthy seedlings if his young crop is to secure an even and vigorous start. The establishing of a field of tobacco under our climatic conditions is one of the most difficult operations, and success is largely dependent upon the class of seedlings planted.

SITE.

An area of good quality soil should be selected for the seedbed, and of such physical nature as to allow for rapid drainage of surplus water. In this connection the placing of the seedbed on gently sloping land is an advantage. The position should be conveniently situated, as the beds must have regular attention. At times as many as three to four waterings are necessary daily. Arrange the beds so that they receive the maximum amount of sunlight, particularly regarding that of the early morning. Do not place them near large trees, whose roots will deprive the young plants of food and water. Shelter also is of advantage, and if a naturally protected area is not available, a brush fence built around the beds will be well worth the time and trouble incurred in erection.

PREPARATION.

Having chosen the site, clear the surface of all rubbish, and thoroughly dig the whole area, including pathways. This digging should be done in autumn or early winter. The seedbed needs to be placed in a high state of fertility, since the young germinating plants quickly exhaust the food stored up in the minute tobacco seeds and are then dependent upon the food supplies which the tiny rootlets are able to extract from the soil. For this reason a heavy application, 30 to 40 tons per acre of well rotted farmyard manure should be dug under. Throughout the winter the land should be kept in a good state of tilth, and all weeds destroyed. In August or early September the nursery may be formed by marking off the area into beds and pathways. The beds should be comparatively narrow, about 3 ft., so as to facilitate weeding, &c. The pathways may be of any convenient width, but it is a mistake to make them too narrow. The same width as the beds is not excessive. The surface soil from the pathways is removed and thrown on to the adjoining beds, thus raising the level by several inches. This assists drainage, and allows for healthier plants if wet weather should be experienced. The surface of the beds should be well worked down to a fine tilth.

STERILISING.

In order to destroy disease spores, injurious pests, and weed seeds which may be present, it is customary to sterilise the surface soil of the seedbeds by burning, fumigating, or steaming. This is a common practice with nurserymen, where special apparatus is utilised for treating seedbed soil. With the tobacco grower, however, these facilities are rarely available, and he is usually compelled to adopt the practice of burning in a comparatively rough, but economical manner. This treatment of the

seedbed is not absolutely essential, but it is well worth the trouble involved in rendering the soil free from weeds, &c. When sterilising by burning, the operation is carried out shortly before the sowing of the beds. Timbers of about 2in. to 3in. in diameter are placed across the bed about 2ft. apart. These keep the fire directly off the soil and allow for better burning. Upon the timber, brushwood is piled to a height of 3ft. to 4ft., thus providing sufficient fuel for a good fire to burn for about half an hour. The fire is lit on the leeward side to allow for a steady burn and good sterilisation of the surface soil to a depth of from 3in. to 4in. The charred and unburned timber is raked off, and on the ashes a light dressing of well rotted farmyard manure free from weed seeds is spread. The seedbed is then well raked to a depth of about 2in. as a final preparation before sowing. If good farmyard manure is not available, equal weights of bonedust and blood manure should be added at the rate of about 3cwts. per acre respectively. Formalin is utilised for sterilisation by fumigation. A 2 per cent. solution is applied by means of a watering can at the rate of half a gallon per square foot. Immediately after treatment, bags or other covers must be placed over the surface to hold the fumes in the soil. The operation may be carried out in autumn or shortly before seeding. The latter is to be preferred, but care must be taken to see that at least a fortnight elapses between treatment and



Tobacco Seedbeds at Penola.

sowing, as otherwise a poor germination is likely to result. Formalin treatment of the seedbed is recommended for the prevention of fungoid diseases.

Steam sterilising is popular in some countries, as the bed may be sown immediately after treatment. Special apparatus is necessary, by which steam is forced under an iron cover about 6in. in depth, placed on the surface of the soil. The steam is applied at definite pressure and maintained for a certain length of time, when in most soils it will have penetrated to a depth of about 6in. The beds are then seeded without further tillage.

Before commencing sowing, the seedbeds should be boarded round with timber, preferably about 1ft. in height, on which the protective coverings will be placed. The area of seedbed required will need to be determined. In this connection, provision should be made for twice, or even three times, the area necessary to supply seedlings for a single planting. The young plants must be in the correct stage of development

at transplanting time. Transplanting may extend over several weeks because of unseasonable or other causes, and if only one seeding is made the late-sown plants are too old for best results. Therefore, three seedings each sufficiently large to supply plants for the whole field is strongly recommended. Each should be spaced at intervals of 12 to 14 days, so that good plants will be available over a period of six to seven weeks. This allows for good selection for filling misses, and is a safeguard against such accidents as frosts or disease wiping out the earlier sowings.

In the Adelaide Hills, September is the usual seeding month, the first sowings taking place in late August, and late sowings towards the end of September or early October. Occasionally even later sowings may prove satisfactory, but are not advisable.

Tobacco seed is extremely small, and approximately 1,000,000 would be required to weigh 3ozs. However, their fertility is low and only 60 to 70 per cent. are capable of germinating. With satisfactory seedbeds, 1oz. will provide sufficient seedlings for about seven acres of land. An area of 100 square feet of seedbed is required per acre of land intended for planting. This necessitates one-seventh of an ounce, or one teaspoonful of tobacco seed. When seeded at this rate, the plants are well spaced and



Glass-covered Tobacco Seedbeds.

strong seedlings provided, whereas thicker seeding causes much additional work in thinning out, if weak, spindly plants are to be avoided. In sowing, the seed is mixed with a liberal quantity of some medium, such as ashes, pollard, sand, &c., so that the small quantity required may be spread evenly over the surface. In order to ensure regular distribution, the mixture for any given area should be halved, and one portion sprinkled over the seedbed travelling up and down. The remaining portion should then be spread with the sowing direction moving at right angles to the first. Under this method two sowings are made over the same area and a more even seeding secured. Only very shallow burial is required, and raking should be avoided. Patting with a flat board will press the seed into the ground to a sufficient depth. Deep covering is a frequent cause of unsatisfactory germination. The bed should be watered lightly, using a fine spray nozzle and keeping the soil moist, but not too wet. Careful attention is essential at this stage, and in warm weather light waterings may be necessary three to four times each day. With favorable temperatures, germination will occur in a

few days, but under cold conditions may take as long as six weeks. The minute plant and tiny rootlets are buried just under the surface soil, and therefore if this is allowed to become dry, the young plant will die, whilst on the other hand, excess water leads to drowning.

COVERINGS.

The coverings should be placed over the seedbeds immediately after the tobacco is sown. These are necessary to protect the beds from frosts, rough weather, and to a certain extent from insect pests. They provide for more uniform temperatures and create a warm condition conducive to rapid growth of plants. A number of materials are used for protective coverings, such as glass, hessian, cloths, boughs, &c., which by means of the supports surrounding the beds provide a cover held about 9in. to 12in. high above the surface of the soil. Glass frames offer certain advantages in that they protect the beds from heavy rains, maintain warm temperatures, and hasten plant development, with the result that seedlings raised under them are ready for transplanting from one to two weeks earlier than when grown under other covers. On the other hand, they are expensive and need removing or sliding along for watering of the beds. Hessian is quite a satisfactory covering. The side protection is the same as



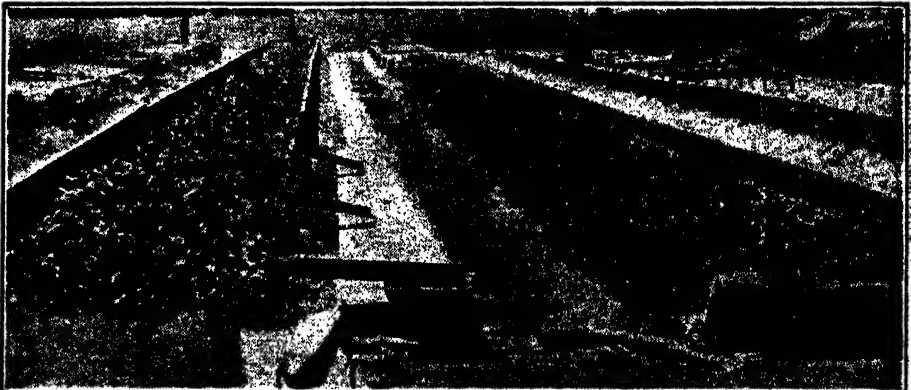
Cloth-covered Tobacco Seedbeds.

for glass, with two or three wires run lengthwise along the beds to support the hessian. Cloth consisting of waterproofed calico is also used to a limited extent. The waterproofing is done by treating in a soap bath (1lb. to 1gall.) and then in a solution of alum (1lb. to 1gall.). The calico is allowed to remain in the soap solution for about half an hour, wrung out, then soaked in the alum solution, and rinsed in clean water. The material becomes quite waterproof, is tacked to frames, and is a very suitable covering. Boughs are spread over wire-netting suspended above the beds, whilst occasionally wattle sticks are placed thickly side by side about 1ft. above the surface soil. The hessian, boughs, and stick covers do not protect the beds from heavy rain, which may saturate the soil and cause very slow plant growth. Other forms which will keep off the rain prevents this soil coldness and usually produce earlier plants. On the other hand, with glass and fabric coverings, care is necessary to see that the

beds receive proper ventilation. During hot days lack of ventilation may result in the scalding of the plants. To overcome this danger, the frames should be gradually raised as required, increasing the space as the weather becomes warmer.

SEEDLINGS.

The beds should be kept well weeded, and, if necessary, the young plants thinned out to about 70 or 80 to the square foot. If they are not making satisfactory headway, it may be necessary to force them along by applications of liquid manure. However, the effect of such applications should be carefully noted, as they may tend to burn the delicate foliage. For this reason, liquid manure should not be applied until the plants have made their fourth leaf. A suitable liquid may be made up by dissolving 1lb. of nitrate of soda or sulphate of ammonia in 10galls. of water. This quantity is sufficient for 100 square yards of seedbed. After applications it is advisable to water the beds, so as to wash the manure from the leaves, and thus reduce the danger of burning. A second treatment may be necessary, but at least a fortnight should elapse between one application and the next. Liquid manure may also be obtained by about half filling a barrel with cow dung and then filling with water. The mixture is stirred at intervals, and let stand for a week. When applying, it is diluted to a strength of 1gall. to 4galls. of water, and used at the rate of from 2 quarts to 3 quarts per square yard.



Hardening off Tobacco Plants.

The plants may be ready for transplanting in about seven to eight weeks after germination, but with more open beds and lower temperatures a much longer period is required. When the plants are about 4in. to 5in. in length they are ready for setting out in the field. If smaller, they are more delicate and do not establish themselves so readily, whilst old seedlings make poor plants, tending to run to flower whilst still quite small. It is obvious that the seedlings should not be removed from the protected seedbeds to the open field without preparation.

This preparation is termed hardening off, and consists of forcing the young plants to become accustomed to more severe conditions, so that the shock of transplanting is not felt to the same extent. When the plants are well established in the seedbed, the watering is limited and only applied when the leaves show signs of wilting. About a fortnight before transplanting is anticipated, the covers are removed, commencing with removal for a few hours, and gradually extending the time until they may be left off altogether. In this way the plants are gradually exposed to open air conditions and do not suffer the same setback as would be the case if set out in the field without being hardened off.

(To be continued.)

DRYING STONE FRUITS.

[A paper read by Mr. A. Rogers at a meeting of the Clare Branch of the Agricultural Bureau.]

The question of preparing stone fruits for drying presents many difficulties to laying down hard and fast rules. For instance, fruit grown under dry conditions needs somewhat different treatment to that which has developed under ideal conditions. First in order, and perhaps the most important, is the apricot. Excellent fruit can be spoilt by careless handling, whereas very ordinary fruit can be brought up to a good marketable article with scientific methods. Allowing that we have well-grown apricots to start on, the first question is, "In what stage of ripeness should they be picked?" The term "eating ripe" is generally used, but that permits a deal of variation, from practically green, to mushy ripe, according to taste. The apricot should be left on the tree so long as it can be handled without crushing in the containers. If petrol tins are used, I prefer to open on the sides; it gives a greater surface and does not damage the fruit so readily. Different methods of splitting the fruit in question can be used, but most in favor is the passing of a sharp knife around the sutural line, being careful that the whole of the flesh is cut—not torn—in the operation. The even cut prevents the loss of syrup during sulphuring, and adds to appearance. The fruit should be opened and transferred to the sulphur-box as quickly as possible. Where practicable, overripe fruit should be discarded or sulphured separately. Overripe fruit absorbs sulphur-dioxide more readily than firm, and if sulphured together, gives an unsatisfactory product. Unripe fruit that may have been accidentally picked may be improved by stacking on trays for a day or so, but this will not make a top-grade product. It is recommended that fruit should be stacked from the bottom upwards in the order in which it is cut. Freshly cut fruit absorbs sulphur-dioxide more readily than that opened some time prior to sulphuring. This arrangement of stacking allows the driest fruit to be in contact with the maximum density of warm sulphur fumes, thus tending to uniform sulphuring results. While this might be good, I would rather depend on spraying the fruit with clean water. On a hot drying day I spray each tray of fruit as it goes into the stack, giving the first pitted the heaviest spraying. I also spray the stack when completed, as well as the ground around, to create a humid atmosphere. Lower the hood immediately and fill around the bottom with damp sand. If possible, trays with a smooth surface should be used in order not to mar the surface of the fruit. If anything special is required, dry on glass. Trays should be hosed before fruit is placed thereon.

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TYPE OF SULPHUR CHAMBER.

Many types of sulphur chambers are in use, but most in favor is the movable hood. They hold an advantage, in that the large sulphur-house takes so long to fill, and if not full, makes the sulphuring more difficult to gauge. Any number of hoods can be used, and they are not very expensive to build. The hood I have in use has an air space of 70 cubic feet, taking 17 5ft. x 2ft. trays, carrying 3½cwt. of split fruit. For the frame, I used 3in. x 1½in. Oregon (joiner's) and covered these with pressed paper. I have had this in use four seasons, and find it stands the sulphur fumes very well. It makes a hood practically airtight and no vent hole is needed with the method of sulphuring I employ.

PREPARING SULPHUR FOR BURNING.

The method often followed is to place coals of fire in a pan, and throw on a given quantity of sulphur.

Sulphuring Apricots.—The regulations in force here and in England regarding the amount of sulphur-dioxide permitted in dried fruit, makes it necessary to keep it below 14 grains per pound and still provide a marketable product and of good color. The accepted quantity of sulphur is from 6lbs. to 8lbs. per ton of pitted fruit, but the weather conditions make a little difference. On a cold, windy day a little more sulphur is needed than on a hot sultry day. That difference, however, is usually corrected by the length of exposure. For sulphuring I have a pit immediately under the trays about 18ins. deep with a channel leading to the outside of the sulphur box, and covered, forming a trap door for convenience in attending to the sulphur-pan. I use 1½lbs. of prepared sulphur to 3½cwt. of pitted fruit, putting in half when closing down, and the remainder two hours later.

PERIOD OF EXPOSURE.

Under average summer day temperatures four to six hours should be sufficient to preserve the color without over-sulphuring. On very hot days, four hours would be long enough. The practice of leaving the fruit in the sulphur chamber over night is not advocated. It may result in over-sulphuring. Also, if left in over night you may find that the syrup (with which the cups are partly filled, and in some cases completely filled), instead of being quite clear, is covered with a milky sulphur residue. When the fruit is not taken out before night, I make a practice of raising the hood a few inches to allow the fumes to escape. If there is any suspicion of over-sulphuring, the sulphuric-dioxide content may be reduced by stacking trays for a day or two. Upon removing from the sulphur chamber, I spread out the fruit for a day to dry up the syrup and make the color secure, after which I prefer to dry in the shade.

When the fruit is dry enough to remove without damaging, three or four trays may be put in one, and again stacked up to finish drying. In that way you have less trays in commission. Fruit such as apricot, peach, nectarine, and prunes that is to be stored and dressed later I allow to become very dry. In that state, it can be immersed in a boiling dressing for a longer period and so destroy any eggs, larvae, or more advanced stage of fruit grub.

OTHER ADVANTAGES.

It is possible to sweat and pack such fruit straight away, whereas fruit on the damp side might have to be put out again to dry. This is to be avoided, for the sun takes off the gloss. Some growers seem to think too much weight is lost by thoroughly drying their fruit, but it is surprising how little moisture it takes to bring it back to a nice, pliable condition. After all, it is sugar that makes for weight. Peaches and nectarines are treated in much the same way as apricots. All dust should be removed from peaches, and, if necessary, hosed before opening.

Of nectarines, the Goldmine is the most favored. Well-shaded fruit without much blush is to be preferred for drying, but the point should be stressed that nectarines of all other fruit must be allowed to ripen on the tree, otherwise they wilt and become bitter.

As a special when the nectarines are opened, put a little sugar in each cup before going into the sulphur chamber. Care must be taken to keep fruit so treated away from ants whilst drying. Nectarines treated in this way and dressed supply an excel-

lent adjunct to the list for dessert. For cooking, we again come to the point of being ripe to facilitate the removal of the skin. I do not know if the practice of removing the skin is general. If not, I make the following suggestion:—Put fruit in saucepan, over which pour one quart of boiling water, add one teaspoonful of carbonate of soda, put on lid, and stand aside for 20 minutes, when skins can be easily removed; after which cook as desired. Unripe fruit does not respond so well.

TREATMENT OF PRUNES.

Treatment of prunes is far more simple. The lye for dipping is usually 1lb. caustic soda to 25galls. of water for well-grown fruit. In the case of prunes grown under droughty conditions, which tends to make the skin tough, more caustic soda should be added.

I prefer to add more caustic soda rather than dip for a longer period to obtain the desired amount of cracking of the skin. The dip should not be allowed to go off the boil. Another practice is to prick the surface of the fruits. To do this latter, pricking boards are used. A shute is made, and the bottom is evenly covered with plaster of paris, and while it is yet soft, pins are placed in it so that about one-quarter of the point projects upwards. They must be close enough to prevent the fruit from lodging between them. The prunes are allowed to run down the shute on to the trays and are then ready for placing in the sun. The practice of dipping is most in favor. D'Agen should be left on the trees until they will shake down, but they will not respond well to dipping if left lying in the hot sun for any length of time.

Robe de Sargent and Splendor especially should be picked off the trees to obtain good results in dipping. My experience with Splendor has led me to consider that a light dip is most satisfactory. Severe cracking of the skin on Splendor prunes allows too much of the pigment to come out, and results in a russet color when dry. If yellow plums are being dried, they should be subjected to sulphur fumes for about eight hours after dipping to preserve the bright golden color of the fruit. After dipping the prunes and plums, spread out to dry off, then stack up and finish drying.

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OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1931-32.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1, White Leghorns—141 birds. Section 2, Black Minorca—9 birds. Section 3, Black Orpington—57 birds.

Twelve Months Test. To start on April 1st, 1931.

Section 1.—White Leghorns.

Competitor.	Address.	Score for Month ended April 30th, 1931.			
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Totals.
Barker, C. R.	Edwardstown.....	(1) 22	(2) 25	(3) 25	72
Hartmann, S.	Salisbury	(4) 14	(5) 17	(6) 19	50
Hartmann, S.	Salisbury	(7) 18	(8) 15	(9) 17	50
Cooper, F. E.	Edwardstown.....	(10) 16	(11) 12	(12) 18	46
Cooper, S.	Edwardstown.....	(13) 18	(14) 17	(15) 6	41
Cooper, S.	Edwardstown.....	(16) —	(17) 9	(18) 19	28
Hutton, Mrs. M. E.	Clarence Park	(19) 17	(20) 22	(21) 18	57
Easther, C. J.	Black Forest	(22) 18	(23) 21	(24) 23	62
Tolhurst, A. E.	Torrens Park	(25) 15	(26) 16	(27) 22	53
Tolhurst, A. E.	Torrens Park	(28) 20	(29) 12	(30) 17	49
Fidge, H.	Clarence Park	(31) 13	(32) 23	(33) 12	48
Fidge, H.	Clarence Park	(34) 1	(35) 17	(36) 5	23
Burton, C. J. C.	Mallala	(37) 10	(38) 20	(39) 19	49
Earl Bros.	Mallala	(40) 10	(41) 12	(42) 5	27
Duhring, T.	Mallala	(43) 18	(44) 14	(45) 15	47
Stanton, L. O.	Warradale	(46) 18	(47) 16	(48) 11	45
Barrett, L.	Angaston	(49) 15	(50) 21	(51) 18	54
Kappler, C. E.	Ascot Park	(52) —	(53) —	(54) —	—
Kappler, C. E.	Ascot Park	(55) —	(56) —	(57) —	—
Harnden, W. R.	Kersbrook	(58) 8	(59) 13	(60) 5	26
Lamerton, E. A.	Edwardstown.....	(61) 6	(62) 19	(63) 17	42
Williams, W. R.	Frewville	(64) 20	(65) 16	(66) 10	46
Heath, H. E.	Mill End.....	(67) 8	(68) 13	(69) 13	34
Gurr, A. & H.	Scott's Creek	(70) 19	(71) 17	(72) 4	40
Gavin, G. C.	Salisbury	(73) 8	(74) 6	(75) 10	24
Gavin, G. C.	Salisbury	(76) 8	(77) 3	(78) 20	31
Gavin, G. C.	Salisbury	(79) 9	(80) 17	(81) 8	34
Gavin, G. C.	Salisbury	(82) 18	(83) 13	(84) 20	51
Robinson, A. E.	Hectorville	(85) 5	(86) 8	(87) 16	29
Brown, C. D.	Morphettville	(88) 8	(89) 5	(90) 7	20
Riggs, N.	Camden	(91) 13	(92) 19	(93) 5	37
Anderson, J.	Warradale	(94) 11	(95) 6	(96) 17	34
Rasmussen, H. A.	Ethelton	(97) 16	(98) 14	(99) 19	49
Parker, S. J. H.	Alberton	(100) 19	(101) 13	(102) 15	47
Hutchinson, A. S.	Athelstone	(103) 21	(104) 18	(105) 20	59
Thomas, C. R.	Hectorville	(106) 15	(107) 15	(108) 18	48
Urlwin, A. P.	Balasklava	(109) 1	(110) 4	(111) 18	23
Wiese, W.	Cabra	(112) 14	(113) 20	(114) 16	50
Wiese, W.	Cabra	(115) 15	(116) 16	(117) 16	47
Williams, W. R.	Frewville	(118) 19	(119) 11	(120) 20	50
Williams, W. R.	Frewville	(121) 23	(122) 20	(123) 20	63
Marsh, C. A.	Gawler	(124) 16	(125) 19	(126) 24	59

Egg-Laying Competition.—Section 1.—White Leghorns—continued.

Competitors.	Address.	Score for Month ended April 30th, 1931.			Totals.
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	
Cleland, W. L.	Beaumont.....	(127) 19	(128) 20	(129) 17	56
Cleland, W. L.	Beaumont.....	(130) 20	(131) 21	(132) 19	60
Sage, H. R.	Nuriootpa	(133) 20	(134) 20	(135) 16	56
Vowels, C. C.	Westbourne Park ..	(136) 14	(137) 18	(138) 17	49
George, L. E.	Redfern	(139) 4	(140) 18	(141) 18	40
Totals.....		392	423	443	1,258

Section 2.—Black Minorcas.

Competitor.	Address.	Score for Month ended April 30th, 1931.			Totals
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	
Gameau, V. F.	Woodville	(142) —	(143) 13	(144) 10	23
Williams, W. R.	Frewville	(145) —	(146) —	(147) 5	5
Earl Bros.	Mallala	(148) 2	(149) —	(150) 7	9
Totals.....		2	13	22	37

Section 3.—Black Orpingtons.

Competitor.	Address.	Score for Month ended April 30th, 1931.			Totals
		Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	Bird No. and Eggs Laid.	
Southon, Mrs. E.	Clarence Gardens ..	(187) 22	(188) 2	(189) 4	28
Gameau, V. F.	Woodville	(190) 12	(191) 7	(192) —	19
Williams, W. R.	Frewville	(193) 17	(194) 20	(195) 28	65
Pillar, L. A.	Hamley Bridge ..	(196) 20	(197) 20	(198) 16	56
Aird, J. R., & Son	Kilkenny	(199) 17	(200) 22	(201) 2	41
Aird, J. R., & Son	Kilkenny	(202) 2	(203) 4	(204) 2	8
Wade, A. E.	Marion	(205) 4	(206) 15	(207) —	19
Tolhurst, A. E.	Torrens Park	(208) 22	(209) 23	(210) 7	52
Tolhurst, A. E.	Torrens Park	(211) 21	(212) 23	(213) 1	45
Compton, R. C.	Woodforde	(214) 24	(215) 21	(216) 8	53
Southon, Mrs. E.	Clarence Gardens ..	(217) 20	(218) 10	(219) 8	38
Heath, H. E.	Mile End	(220) 15	(221) 20	(222) 1	36
Wittenbury, W. H. L.	Goodwood	(223) 14	(224) 10	(225) —	24
Gurr, A. & H.	Scott's Creek	(226) 20	(227) 4	(228) 7	31
Robinson, A. E.	Hectorville	(229) 22	(230) 6	(231) 10	38
Smart, H. J.	Grovene	(232) —	(233) —	(234) —	—
Williams, W. R.	Frewville	(235) 13	(236) —	(237) 4	17
Williams, W. R.	Frewville	(238) —	(239) —	(240) —	—
Osborn, E. L.	Camden	(241) 8	(242) 26	(243) —	34
Totals		273	233	98	604

SILVER LEAF.

[By E. LEISHMAN, Horticultural Instructor, Mount Lofty Ranges District.]

Attention has been drawn for several years in the Hills district to the silvering of the leaves of the plum and to a lesser extent the cherry and apple trees. I have made frequent observations on trees so affected, but until this season no definite evidence has been procured to show that the cause was due to the bracket fungus (*Stereum purpureum*).



Fruiting bodies of Fungus (*Stereum purpureum*) found on an apple tree at Carey's Gully.

With Mr. S. D. Garrett, Assistant Plant Pathologist at the Waite Agricultural Research Institute, I made an inspection in an orchard situated at Carey's Gully, where the silvering of the leaves appeared on plum, cherry, and apple trees.

Fructifications of this fungus were found on the plum; although not present on the apple and cherry, it was probable that they were attacked by the same fungus. Since this visit to this orchard, I have located fruiting bodies of this fungus in orchards at Forest Range, Bridgewater, and Carey's Gully on plum and apple trees.

SYMPTOMS.

Usually, in the beginning, the disease is confined to a single branch or twig, causing the leaves to assume a silvery hue approaching the colour of lead. The branch showing this affect generally dies, and from year to year other branches are affected until the whole tree is involved. Probably three to six years elapse before the tree is wholly killed. The silvering of the leaves is claimed to be due to the secretions of toxins by the fungus in the stem. On the dead limbs and trees the fruiting bodies of this fungus appear. This bracket fungus may be distinguished by the fact that the inner spore bearing surface or hymenium is always quite smooth of a lilac to purple color. Where leaf silvering due to this fungus occurs, a brownish discoloration of the wood towards the base of the branch is always found.

CONTROL.

Stereum purpureum is a wound parasite and can cause infection only through wounds due to pruning, bruising the bark of limbs, and breaking off of branches. Trees affected with this fungus do not always die; young and vigorous trees may occlude the fungus by the formation of an impenetrable gum barrier around the invaded tissues.

Resistant varieties are those in which this gum barrier is most readily formed. During the summer months (June, July, and August) in England all varieties of plums exhibit this gum reaction so strongly that no infection can occur. The usual measures of fruit disease control do not apply to "Silver Leaf," therefore precautionary means should be taken.

Mr. S. D. Garrett, who had an opportunity to observe work in this connection in England under Dr. F. T. Brooks, recommends the following control:—

1. All wounds should be protected as soon as possible by covering either with soft grafting wax or an antiseptic thick paint, made up as follows:—To 2lbs. of white lead paste (as bought), add two teaspoonfuls of paste driers and two tablespoonfuls of linseed oil. Mix, then add two tablespoonfuls of turpentine and mix well.

2. By the Silver Leaf Order of 1923, English growers are compelled to destroy before midsummer all dead, woody tissues capable of harboring the fungus, meaning not only dead branches actually on the trees, but all dead wood lying about the orchard.

By cutting out dead branches shortly before mid-summer (July 15th in England) the risk of re-infection through wounds thereby made is reduced to a minimum, for the spores of the fungus are then least abundant. It is exceedingly difficult for the fungus to cause infection at that season.

3. In the early stages when the silvering is confined to a few branches, the disease may be controlled by cutting these out early in the summer. Care must be exercised to cut back well beyond the limit of the discolored wood however, otherwise the operation will have been useless. There is, however, a chance that with young and vigorous trees silvered branches may recover. The chances of natural recovery may be materially increased by careful manuring.

The importance of painting wounds with an antiseptic paint after pruning operations has always been advocated as a precautionary measure against fungus diseases. Definite proof that the Silver Leaf disease is in the district should stress the importance of the operations, such as destroying dead limbs, more especially in orchards where Silver Leaf has appeared.

This fungus was determined from portions of an old apricot tree carrying "silvered" foliage in an orchard in the Clarendon district by Mr. G. Samuel, of the Waite Institute, some four years ago. Mr. Geo. Quinn (Chief Horticultural Instructor), who discovered the specimens, was able to secure the fructifications of the fungus at the same time.

THE MARKETING OF AUSTRALIAN EGGS OVERSEAS.

A recent report issued by the Department of Markets indicates that the 1930 egg export season has been the most successful one since compulsory grading and supervision were adopted by the Commonwealth Government. There has been a very welcome absence of complaints from overseas regarding breakages, falling off in quality, and defects in packing, which were, unfortunately, associated with former years, and, generally speaking, exporters have expressed satisfaction with prices realised. Breakages were less than half of 1 per cent.

SEASON'S EXPORTS.

The record quantity of 5,895,090 dozen eggs were exported during the season, the various States contributing the following quotas:—

New South Wales	2,434,020 dozens
Victoria	1,612,080 "
Queensland	831,210 "
South Australia	673,560 "
Western Australia	344,220 "
Total	5,895,090 dozens

The following table shows how Australian exports have steadily increased since 1927:—

	N.S.W. doz.	Vic. doz.	Q'ld. doz.	S.A. doz.	W.A. doz.	Total. doz.
1925	802,421	393,142	30,151	266,730	39,300	1,531,744
1926	1,839,046	616,561	191,458	318,900	186,025	3,151,990
1927	447,996	343,020	236,484	11,250	65,255	1,104,005
1928	858,798	727,952	824,704	393,250	111,634	2,916,338
1929	1,627,780	472,200	919,410	358,490	174,720	3,552,580
1930	2,434,020	1,612,080	831,210	673,560	344,220	5,895,090

It will be seen from the above that—

N.S.W. has risen from	447,000doz. in 1927 to	2,434,000doz. in 1930
Vic. "	343,000doz. "	1,612,000doz. "
Q'ld. "	236,000doz. "	831,000doz. "
S.A. "	11,000doz. "	673,000doz. "
W.A. "	65,000doz. "	344,000doz. "

The demand for eggs is steadily growing in Great Britain, and the following table gives an interesting comparison for the years 1928 and 1930:—

	1928.	1930.
Home production of Eggs	199,663,333doz.	211,666,660doz.
Imports into Great Britain	264,670,000doz.	265,609,140doz.
Total Consumption.....	464,333,333doz.	477,275,800doz.

The steps which Great Britain took in 1928 to foster her home production have been rewarded by the production of an additional 12,000,000 dozen eggs per annum, but despite this fact, it is gratifying to learn that, whereas in 1928 Australia supplied only three eggs out of every 1,000 consumed in Great Britain, she now supplies 12 eggs in every 1,000 consumed.

Consumption of eggs has been greatly stimulated in Great Britain, and it is estimated that 26,500,000 more dozens of eggs were consumed than during the preceding year. In fact, production in England during 1930 was the greatest ever known. Another important factor which helped to make a market for imported eggs was that Russian eggs, which usually have an important bearing on the market, were not handled to any extent during the season.

COMPARATIVE PRICES PER LONG HUNDRED.

Week Ending	Australian.			South African.			Argentine.		
	14lb. Pack.	15lb. Pack.	16lb. Pack.	13½lb. Pack.	15lb. Pack.	16lb. Pack.	15lb. Pack.	15-16lb. Pack.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
10th Oct.	13 0 - 13 6	14 0	14 0 - 14 6	12 0 - 12 9	13 6 - 14 0	—	—	—	—
17th Oct.	—	—	—	12 9 - 13 0	13 9 - 14 0	14 9 - 15 0	—	—	—
24th Oct.	14 6	15 6	16 6	14 0 - 14 6	14 6 - 15 6	16 0 - 16 6	14 0 - 14 6	—	—
31st Oct.	15 0 - 15 6	16 0 - 16 6	17 0 - 17 6	14 6 - 15 0	16 0 - 16 6	17 0 - 17 3	—	15 0 - 15 6	—
7th Nov.	—	16 0 - 16 3	17 0 - 17 3	14 0 - 14 6	15 9 - 16 6	16 6 - 17 3	—	15 9 - 16 0	—
14th Nov.	—	16 0	16 6 - 17 0	13 1 - 14 6	16 0 - 16 6	16 6 - 17 3	—	14 9 - 15 0	—
21st Nov.	—	15 0 - 15 6	15 6 - 16 0	12 6 - 13 6	15 0 - 16 0	16 0 - 16 6	—	12 9 - 13 6	—
28th Nov.	12 6	—	15 0	11 9 - 12 9	14 0 - 15 0	15 0 - 15 6	—	11 9 - 12 0	—
5th Dec.	—	14 0 - 14 3	15 0	12 3 - 13 0	14 3 - 15 0	15 6 - 16 0	—	—	—
12th Dec.	13 6	15 0 - 15 3	—	13 0 - 13 6	15 0 - 15 6	16 6 - 17 0	—	—	—
19th Dec.	13 6	15 0	16 0	13 6 - 14 0	15 0 - 16 0	16 6 - 17 0	—	12 6	—
24th Dec.	12 3	—	15 0	12 9 - 13 6	14 6 - 15 6	16 0 - 16 6	—	—	—
2nd Jan.	12 0	13 0 - 14 3	14 0	12 0 - 12 6	14 0 - 15 6	16 0	—	—	—
9th Jan.	—	13 6	14 0	12 0 - 13 0	14 0 - 14 6	14 9 - 15 3	—	—	—

The preceding table shows the prices received during the 1930 Australian export season, and a comparison is appended showing the prices received for South African and Argentine eggs during the same season when Australian eggs met the direct competition of countries of the Southern Hemisphere having the same season of production. Two interesting points revealed in this table are, firstly, the drop in prices which took place about the Christmas season, and although not so definitely marked in the 1930 season, it has occurred in every season. As a matter of fact, in a cablegram received from the High Commissioner on the 27th January it was stated that eggs of the 15lb. pack were then realising 10s. 6d. per long hundred. This, as against 16s. 3d. on the 7th November and 15s. on the 19th December.

The other point to be noticed is that South African eggs fetched a higher price than Australian eggs week by week.

SOUTH AFRICAN COMPETITION.

Although it is known that South African eggs must necessarily be fresher than Australian on account of the differences in distance of the two countries from England, it is not considered that this is the dominant factor in such price discrimination. South Africa has, in recent years, conducted an intensive publicity campaign in England, and last year went so far as to send a publicity representative to England for the sole purpose of placing South African eggs prominently before English consumers. This representative had nothing whatever to do with sales, but concentrated on publicity. Large displays were made on railway stations, hoardings, exhibitions in large stores and stands arranged at trade exhibitions, and advertisements in newspapers, in all costing £1,200, and South African exporters would seem to have been fully repaid by the enhanced prices received. (The funds for this campaign were raised by a small levy on exports.)

A further reason for the South African price advantage last season may be found in the fact that the minimum of her 15lb. pack (which is the most popular pack) is 1½oz., whereas the minimum of the Australian 15lb. pack was 1¼ozs. The Australian pack looks irregular and compares unfavorably alongside the South African pack, with which it is sold in competition.

The following table shows the quantity of eggs of each pack which were exported by the various Australian States during the season:—

Cases of 30 Dozen.

	12lb.	13½lb.	14lb.	15lb.	16lb.	17lb.	18lb.	Duck.	Total.
N.S.W.	—	—	37,004	14,257	30,373	—	—	—	81,634
Victoria	500	366	176	47,983	1,937	2,724	61	353	54,100
Queensland ..	—	—	—	27,686	—	—	—	—	27,686
Sth. Australia	—	—	101	23,505	86	1,500	—	—	25,192
W. Australia	—	952	512	8,719	1,161	130	—	—	11,474
Tasmania ..	—	—	—	—	—	—	—	—	—
Total ..	500	1,318	37,793	122,150	33,557	4,354	61	353	199,986

The proportionate make-up of the different packs in the total export during the season was as follows:—

	%
13½lb. pack	0.6
14lb. pack	19
15lb. pack	61
16lb. pack	17
17lb. pack	2.4

It will be seen that the 15lb. pack was still the popular pack in all States, although it will be remembered last year its minimum was reduced to 1¼ozs. in place of the 1½ozs. of the previous year. In New South Wales, however, 37,004 cases of the 14lb. pack were exported and 30,373 cases of the 16lb. pack, but only 14,257 boxes of the 15lb. pack.

THE 13½LB. PACK.

Attention is drawn to the very small percentage of the 13½lb. pack exported, although the regulations were specially amended at the insistent demand of exporting interests to permit such a pack being exported in the 1930 season. The opinion is expressed that too many varieties of lower grade eggs are not helpful to marketing conditions, as they all serve to fill the same price retail. The results show that the amendment of the regulations to permit a pack of 100 per cent. 1½oz. eggs being exported was not justified, and as the amendment was granted subject to review at the end of the season, consideration will be given to the exclusion of this pack in future shipments. During the year certain criticism was levelled at the Department for allowing so many packs for export, and a proposal was made that the English standards for grading should be adopted. The following statement, which was issued by the Department, on the proposal sets out the case for the grading standards adopted, and is thought worthy of repetition here:—

“The fact must not be lost sight of that we do not sell our eggs in competition with English eggs. The English egg is a fresh egg; the Australian egg must always be from six to eight weeks older, and the fact that the word ‘Australia’ is stamped on its shell in accordance with English requirements makes this fact always apparent. The English buyers of Australian eggs, therefore, look for good quality, good packing ensuring minimum breakage, and uniformity in size. It goes without saying that the first two factors are the primary conditions of sale, and apart from the state of the market at any given time, uniformity in size must be the final determinant of the price realised.

“If a buyer finds in the eggs offered a wide variation in size, his offer will invariably be based on the size of the smallest sized egg in the pack. Therefore, by providing minimum and maximum weights for the eggs in any particular pack, it follows that every pack is of uniform size and the price must be based accordingly. The English regulations provide for four grades, viz.:—

Pullet eggs, which are under 1½oz.

Medium eggs, which must be of 1½oz. minimum.

Standard eggs, which must be of 2oz. minimum.

Special eggs, which must be of 2½oz. minimum.

“But the point to be noted is that no maximum is provided under any grade, except pullet eggs, and these are prohibited from export from the Commonwealth.

“The Commonwealth regulations at present in force provide for six grades:—

No. 1. 13½lb. to the long hundred (10doz.) of 1½oz. eggs.

No. 2. 14lb. to the long hundred (10doz.) of 1½oz. to 2oz. eggs.

No. 3. 15lb. to the long hundred (10doz.) of 1½oz. to 2½oz. eggs.

No. 4. 16lb. to the long hundred (10doz.) of 2oz. to 2½oz. eggs.

No. 5. 17lb. to the long hundred (10doz.) of 2½oz. to 2¾oz. eggs.

No. 6. 18lb. to the long hundred (10doz.) of 2¾oz. to 3oz. eggs.

“If a study of these regulations be made it will be seen that there are three grades, namely, the 13½lb. pack, the 14lb. pack, and the 15lb. pack, in which exporters may pack to conform to the requirements of the English medium egg; that the Australian 16lb., 17lb., and 18lb. packs conform to the requirements of the English standard egg; and that the 18lb. pack provides the equivalent of the English special egg. Should, however, the English standard be adopted, the whole of the export surplus would be put up as the 1½oz. minimum pack, and eggs ranging from 1½oz. to 2½oz. would be indiscriminately mixed, no uniformity would be observed, the objects of grading would be defeated, and buyers would base their price on the smallest sized egg in the pack, namely, the 1½oz. egg. For this reason, therefore, the Department of Markets has at all times placed before the egg industry the desirability in its own interests of maintaining close grading, and only consented to the special provision for 1½oz. eggs for this season to prevent a glut on the local markets with which the industry as a whole represented itself to have been faced.”

EXPORT OF OILED EGGS.

During the season approval was given to the exportation of eggs which had been subjected to a process of oiling for the purpose of checking evaporation. When these eggs arrived in England it was ascertained that the regulations of the Ministry of Agriculture and Fisheries prescribed that eggs so processed must be marked on the shell with the word "preserved." On outturn it was found that the quality of the eggs so processed was excellent, but an abnormal percentage was broken throughout all the consignments.

The effect of the words "preserved" was to reduce the value of the eggs from 2s. to 3s. per long hundred below average market price for the same eggs unstamped. Thus the object of the oiling to prevent evaporation was defeated by the regulation which provides that eggs so treated must be marked "preserved." In fact, as one importer stated, although the eggs are equal to, and perhaps better than, eggs which had not been oiled, the fact remains that when an English buyer buys eggs which are stamped "preserved," he expects to get them at a discount.

Furthermore, a careful investigation was made as to why oiled eggs should be more susceptible to breakage than eggs which had not been oiled, and it is the considered opinion of representative English importers that the oiling process creates a surface on the shell that has a definite resistance to the filler, the result is that eggs stand suspended in the filler, and when other layers are super-imposed, plus the extra pressure of the lids and the wiring, the eggs are crushed. In addition to this, oiling gives a hard and unnatural appearance to the shell; it also creates a certain amount of first two market and realised. "If a be based minimum every regula

BRANDING.

Some exporters sent eggs to England during the season with only the top and bottom layers branded, the eggs in the middle layers being unmarked. These were criticised by the Customs authorities, who took a very serious view of the matter. I am remembered that an unbranded egg in England is treated as an English one, and has a much greater value than the imported egg at the time when Australian imports are arriving on the market. Exporters are warned against this practice as the Customs authorities have notified that they will take drastic steps in the future if instances be discovered. The need is stressed of protecting the Australian reputation in this regard.

It is also pointed out that the stamping of the word "Australia" was, in too many instances, a mere indecipherable smudge. Apart from the requirements of the English Merchandise Marks Act not being fulfilled, the consumers' objection to such an egg when placed before him will be easily understood, and above everything else it is a bad advertisement for the Australian product.

CASES NOT NAILED.

Another complaint was that some cases arrived which had been wired, but not nailed. When these cases were opened in an inverted position, breakages were considerable. The attention of the trade is drawn to this complaint, and it should be easily rectified by nailing the lids. On this score also a misapprehension arose regarding the labels, which were considered to be put on upside-down.

WASHED EGGS.

An experimental shipment of washed eggs was made during the season. The eggs arrived in England in a state of putrefaction, the yolks having been dissolved in the whites. It would appear that washing increases the porosity of the shell, and thus permits a higher rate of evaporation, because the protective film on the shell is destroyed.

The department will, therefore, not permit the export of washed eggs in the future, and it is pointed out that if proper care is exercised on the farm there should be no need for eggs to require washing.

Evidence of Ford Quality

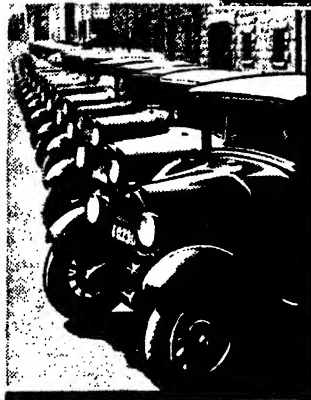


Australia's greatest City Councils choose Ford Vehicles!

TO meet the strict requirements of City Council work, motor vehicles must measure up to high standards of quality, dependability, performance and economy. Significant, then, that after years of experience with many makes, the Melbourne City Council has standardised on Ford Cars, Trucks and Light Deliveries for all vehicles of up to two tons capacity, while the Sydney Municipal Council has a fleet of no less than 120 Ford vehicles.

And these City Council fleets must be British. Throughout Australia there is a demand that public money be invested in British products. Authentic figures prove the Ford British content unusually high even among English makes; some Ford models ranging up to 92% British in actual manufacture.

The Ford commercial range covers thirty distinct standard models from half ton to two tons capacity And special equipment is available which increases the Ford Truck's capacity to four tons, yet with running costs increased only 15 to 20% over those of the standard 30 cwt. Truck. Extended chassis, six-wheel equipment, trailers and semi-trailers can be supplied through your nearest Ford Dealer. Ask him for facts and figures of Ford transportation costs. These will assure you of value far above the Price.



*Melbourne City Council Maintenance and
Cleaning Fleet of Ford Trucks.*



Ford Motor Co. of
Australia Pty. Ltd.



Units of Melbourne City Council Electricity Supply fleet of Ford Vehicles



Sydney Municipal Council uses these Ford Cars and Light Delivery vehicles in its Electricity Department

SHIPMENTS TO OUTPORTS.

Shipments to ports other than London were considerable during the season, with the result that the reputation for Australian eggs is extending beyond the English metropolis, and the severe losses through breakage on the English railways, when eggs were extensively transported from London to such cities as Liverpool, Hull, and Glasgow, are being avoided.

The following comments are, however, made respecting the outports:—

Liverpool is the best west coast centre for consignments, as the port possesses the best facilities for handling, and is also the most convenient for re-transportation to the Midlands and the adjacent areas. Furthermore, ample cold storage accommodation is available there in case of need.

Hull.—Buyers showed a disinclination to taking delivery from this port in the early part of the season. There is a good deal of trade depression in this area, and "cheap" eggs were the only ones in appreciable demand. Furthermore, many merchants in the area have running contracts for Danish pickled eggs. During the latter part of the season Manchester buyers were induced to take delivery ex Hull, and the prospects for a continuance of this plan next season are promising, although the fact must not be overlooked that this means transport by rail with consequent risk of breakage.

Glasgow.—This port has excellent prospects, but great difficulty is experienced by Australian shippers in securing direct freight to this port, and even when it is secured there is always the risk that a steamer will take a very long time to reach Glasgow on account of the many intermediate European ports called at.

It was noted that small eggs sold readily and at fair competitive prices in Liverpool and Manchester, but, if possible, such eggs should not be sent to Glasgow or London. In both these cities the principal importers are nervous lest these small eggs should be associated in the mind of the trade with Polish, Egyptian, and Chinese eggs of poor quality.

MARKETING OF AUSTRALIAN EGGS.

In summing up the lessons to be learned from the 1930 season, there is one outstanding feature which exporters would be strongly advised to bear in mind, and it is the fact that all Australian eggs should be shipped in time to reach the market before the English Christmas season. All exports landed after that time meet a rapidly falling market. Furthermore, Australian exporters are warned that observation shows that the home producers have greatly improved their methods under the encouraging stimulus given them by the Hume Government, and are concentrating their endeavors to bring about the earlier production of new laid eggs by a week or even more, so as to catch the Christmas markets. If this is accomplished, Australian exporters will have to make such arrangements as to ensure the clearing of all stocks before the arrival of English and Continental new laid stocks on the English market.

ADVERTISING.

The proposal that the egg exporting industry participate in the Australian trade publicity campaign in Great Britain has been adopted by the interstate conference of egg producing exporting interests, which met in Melbourne recently. The conference recommended that a levy of 2d. per case be made on all exports for the purpose of raising the necessary funds for advertising.

CANADIAN MARKETING POSSIBILITIES.

One of the features in past years has been the reluctance of exporters to cease export operations to Great Britain early in November, as the consequent flooding of Australian markets with eggs diverted from export naturally caused a fall in local markets. It is in this connection that the Canadian Market offers possibilities, and if Australian exporters would co-operate in November and December to secure space on eastern seaboard American steamers and exploit the Canadian Market, it is possible that local markets could be kept on an even keel and another market opened up abroad.

The details of the prospects of the Canadian marketing scheme may be gleaned from the following:—

“Some years ago there was a large spread in Canada as between winter and summer prices. There has, however, in recent years, been a sustained campaign for the encouragement of winter egg production, which seems to have brought about results, particularly in British Columbia, consequently the spread is not now what it used to be, and one indication of this is to be found in the Canadian storage arrangements. The practice of cold storage owners is to quote merchants a flat rate per case for storage for the entire season, the holder being free to quit his stocks at any time. About ten years ago, the rate covered a period from the time of intake (April-June) up to the 15th of January following, but later the period was reduced to the 1st of January, and about two years ago was altered to the 1st of December. Increased storage charges accrued after that date. Accordingly the storers generally plan to quit stocks gradually between September and the 30th November, unless exceptional market conditions justify a longer carry over. Montreal commenced trading on April-June, 1930, cold stored eggs at the end of August last.

“Apart from the tendency for local winter production to increase (particularly in British Columbia, where the winter is milder), the practice has been to import from the United States as from December, and the fact that United States supplies are usually available then, has been a factor influencing the December 1st storage date arrangement. The Canadian import duty against the United States is 10 cents per dozen, whilst Australian eggs are admitted free into Canada at present under our treaty. Australian exporters have, therefore, an advantage of 10 cents per dozen over the U.S.A. product.”

Thus the diversion of the Australian product from the United Kingdom to the Canadian market, at the moment when it is desirable to cease exporting to United Kingdom, would seem to be well worthy of consideration.

Concerning the possibilities of marketing Australian egg pulp in Canada, it is realised that the present duty of 10 cents per lb. is a big handicap; but it is the intention of the Australian Trade Commissioner in Canada to take the matter up with the Canadian Government, with the view of having Australian egg pulp admitted into Canada free of duty, as are Australian eggs admitted free under the Australian Treaty. The best packs recommended for Canadian trade are the 15lb. and 16lb. packs.

OTHER CONSIDERATIONS.

Other matters for consideration may be briefly set forth as follows:—

- (1) A mixing of brown and white eggs seems to be desired by English exporters.
- (2) The legible stamping of the word “Australia” on all eggs.
- (3) The stamping of all eggs in each case, not the top layers only, as the English authorities regard this as a very serious breach of the Merchandise Marks Act.
- (4) The need for egg-exporting interests throughout the States to co-operate to ensure regular weekly shipments. South Africa was able to arrange regular weekly supplies on the London market, and although the difficulties confronting Australian exporters in this respect are known, still the Department considers that this aspect of the trade can be improved.

It is undesirable that Australian eggs be landed in large quantities in one week on the English market and a fortnight later to find the market bare of supplies.

It is considered that the steps that have been taken in forming a provisional Commonwealth Council of State Egg Producers' Organisations are very desirable in the interests of the industry to co-ordinate efforts and deal with export problems, pending the creation of Egg-marketing Boards in each State, from which might be created a Commonwealth Board for the control and disposal of eggs and egg pulp.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1931.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow October to March.	Per Herd during March.	Per Cow during March.	Per Cow October to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ...	28	15-68	8,434	300-67	2,928-18	453-90	16-18	143-50	5-41
5/D ...	29-94	19-19	7,298½	243-77	2,636-37	419-07	13-90	140-66	5-70
5/E ...	35	28-45	11,067	316-20	2,731-78	568-49	16-24	140-41	5-14
5/J ...	23	12-19	3,795½	165-02	2,045-35	194-32	8-45	110-80	5-12
5/O ...	21-42	14-81	5,142	240-05	3,302-68	293-85	13-72	176-29	5-71
5/R ...	54	40-74	12,114½	224-34	2,145-60	517-32	9-58	91-23	4-27
5/S ...	30	12-58	6,402	213-40	2,274-24	329-51	10-95	113-69	5-13
5/T ...	20	13-52	7,371½	368-58	3,179-09	362-54	18-13	143-65	4-92
5/U ...	21	14-26	10,957½	521-78	3,905-99	468-61	22-31	168-81	4-28
5/Y ...	26-26	24-10	12,787½	485-05	3,715-00	740-22	28-19	195-11	5-81
5/Z ...	29	13-32	12,108½	417-53	3,960-05	600-82	20-72	189-25	4-96
5/AA ...	18	16	8,106½	450-86	2,707-55	443-85	24-66	137-60	5-46
5/CC ...	29-94	12-90	6,444½	215-25	1,829-10	269-74	9-01	80-68	4-19
5/DD ...	21-81	17-77	8,514½	390-39	3,000-91	472-78	21-68	155-99	5-55
5/EE ...	14-39	13-97	6,644½	461-74	3,721-01	340-91	23-69	179-94	5-13
5/II ...	28	16-94	7,813	279-04	3,627-88	397-13	14-18	171-25	5-08
5/JJ ...	27-61	18-06	9,000½	325-72	3,211-98	416-95	15-10	147-08	4-63
5/KK ...	22-71	16-58	11,769	518-23	3,092-48	542-22	23-83	140-88	4-61
5/MM ...	14	13-45	8,451	603-64	3,464-50	461-36	32-95	180-70	5-46
5/NN ...	29	24	11,997	413-69	3,345-28	576-68	19-89	148-57	4-81
5/OO ...	21-23	17-16	9,308½	436-93	3,322-36	463-31	21-77	151-90	5-07
Means .	25-92	17-89	8,832-26	340-76	2,965-30	444-27	17-14	142-94	5-03

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1931. *

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow July to March.	Per Herd during March.	Per Cow during March.	Per Cow July to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/D ...	25-23	20-90	13,642	540-41	5,732-00	568-23	22-52	240-94	4-17
7/E ...	26-52	24-61	12,344½	465-48	6,034-08	529-06	19-95	251-55	4-29
7/H ...	8	6-77	3,807	475-87	6,037-10	192-75	24-09	287-79	5-06
7/J ...	17-32	15-32	10,075	581-69	5,420-93	463-84	26-75	254-16	4-60
7/K ...	18-84	17-29	8,878½	471-26	6,624-70	384-87	20-40	285-60	4-33
7/L ...	35	33-87	12,388½	353-96	4,468-83	650-68	18-59	211-82	5-25
7/O ...	20-26	19	8,528½	420-07	3,998-32	415-95	20-49	191-18	4-89
7/S ...	14-48	8-90	2,157	148-96	4,967-46	114-77	7-93	263-66	5-32
7/T ...	11	10	4,789½	435-41	4,818-64	202-67	18-42	202-77	4-23
7/V ...	10-03	9-03	5,607½	559-06	4,063-00	282-16	28-13	195-11	5-03
7/W ...	21	17-03	10,572½	503-46	5,787-72	465-23	22-16	281-05	4-39
7/X ...	15	13	6,060½	404-03	5,841-43	369-07	17-94	248-23	4-44
7/Y ...	21	18-10	8,807	409-86	4,297-78	411-03	19-57	204-41	4-78
7/Z ...	11-61	10-29	9,299½	800-98	4,220-93	409-64	35-23	188-29	4-40
7/AA ...	8	7	3,224	403-00	4,181-50	159-86	19-08	210-30	4-66
7/BB ...	15	13	9,284½	618-97	5,424-77	433-39	28-89	227-67	4-67
7/DD ...	11-29	9-65	5,413	479-44	5,515-13	282-73	25-04	273-67	5-22
7/EE ...	25-26	17-45	5,545	219-52	3,712-27	259-44	9-45	154-32	4-32
7/GG ...	14	14	5,801	378-64	4,193-52	231-41	20-10	215-25	5-31
7/HH ...	17	13-85	6,578	386-94	4,543-23	301-06	17-71	199-58	4-56
*7/II ...	13	9-77	5,138	395-23	4,216-99	255-75	19-67	201-55	4-98
†7/JJ ...	19	19	10,943	575-95	1,954-81	501-39	26-39	86-31	4-58
Means	17-17	14-65	7,644-73	445-12	5,082-06	355-18	20-68	229-86	4-65

Commenced August.

† Commenced January.

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1931.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow December to March.	Per Herd during March.	Per Cow during March.	Per Cow December to March.	
6/B ...	20	7-33	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/C ...	18	10-16	1,798½	89-93	1,071-66	86-79	4-34	47-67	4-83
6/F ...	24	11-74	3,077½	170-97	1,369-86	134-57	7-43	58-45	4-37
6/H ...	20	16-77	4,764	198-50	1,729-80	233-43	9-73	78-84	4-90
6/O ...	19-97	16-03	5,679	283-95	1,620-20	231-49	14-07	73-23	4-96
6/R ...	18	16-03	5,781½	289-51	1,867-22	314-28	15-74	92-25	5-44
6/U ...	18	7-52	3,279½	182-19	724-66	157-66	8-76	41-22	4-81
6/W ...	18-10	15-10	5,602½	309-53	1,474-72	242-06	13-37	59-77	4-82
6/Y ...	23	17-90	9,332	407-91	1,977-87	445-26	19-36	91-40	4-75
6/Z ...	15	9-94	4,001	266-73	1,623-94	202-63	13-51	70-32	5-06
6/Er ...	50-48	39-61	22,412½	443-99	1,949-79	590-77	17-82	81-97	4-01
6/Il ...	34	27-71	16,375	481-62	2,474-31	759-72	22-34	108-46	4-64
6/Kk ...	26-29	22-81	16,086½	612-26	2,362-86	752-07	23-63	104-42	4-68
6/Ll ...	23-16	21-64	12,791	552-28	2,522-97	586-31	25-32	109-97	4-58
6/Mm ...	14-06	9-19	4,410½	313-68	1,447-69	208-09	14-80	69-16	4-72
6/Oo ...	20	17-48	14,948½	747-43	2,575-87	662-43	33-12	115-13	4-43
6/Pp ...	20	20	13,175	658-76	2,612-01	661-84	33-09	124-47	5-02
6/Qq ...	23-48	25-45	18,840½	861-53	2,944-40	910-85	31-98	123-05	4-83
6/Rr ...	31-39	26-19	19,532½	622-25	2,830-14	878-99	28-00	124-08	4-50
6/Ss ...	26	24	20,940½	805-40	3,545-62	812-03	31-23	142-07	3-88
6/Tt ...	23-26	22-23	12,438½	534-76	2,002-85	616-14	26-49	92-24	4-95
6/Uu ...	41-13	36-77	17,286	420-37	1,993-35	792-60	19-27	86-68	4-61
6/Vv ...	20	17-94	12,508½	625-43	2,149-11	600-68	30-03	101-54	4-80
Means .	24-29	19-26	11,141-86	458-75	2,114-62	510-92	21-04	93-72	4-58

RATIONS FOR DAIRY COWS.

Special interest has been shown by many producers in this State in the remarks made by Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) at the Lyndoch Conference, and reported in the March issue of this *Journal*. Mr. Coleman has received numerous inquiries with reference to the meal included in the balanced rations which were drawn up after consultation with Mr. H. B. Barlow (Chief Dairy Instructor). For cows producing 3galls. or 4galls. of milk the rations were calculated on the use of linseed meal (Meggett's), and the table of balanced rations was as follows:—

For a 3gall. cow—

Wheaten hay chaff	20lbs.	Ratio albuminoids to carbohydrates, 1-5.2
Wheaten bran	4lbs.	
Linseed meal	2lbs.	

or

Oaten hay chaff	20lbs.	ratio 1-5.0
Crushed oats	4lbs.	
Linseed meal	2lbs.	

For a 4gall. cow—

Wheaten hay chaff	20lbs.	ratio 1-5.9
Crushed oats	4lbs.	
Wheaten bran	4lbs.	
Linseed meal	2lbs.	

For a 3-4gall. cow—

Oaten hay chaff	20lbs.	ratio 1-5.2
Wheaten bran	4lbs.	
Crushed oats	4lbs.	

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF YORKE PENINSULA BRANCHES.

The Annual Conference of Branches of the Agricultural Bureau was held at Maitland on April 15th. There was a good attendance of delegates from the following Branches:—Weavers, Moonta, South Kilkerran, Boor's Plains, Wauraltee, Yorketown, Petersville, Kilkerran, Paskeville, and Brentwood, in addition to visitors from Kadina, Minlaton, and Maitland.

The Department of Agriculture was represented by Hon. S. R. Whitford, M.L.C. (Minister of Agriculture), Mr. F. Coleman (Chairman Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. H. F. MacIndoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Inspector of Stock), R. Hill (District Agricultural Instructor), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau). Messrs. E. Giles and B. Pattison, M'sP. for the district, were also present.

Mr. J. J. Hentschke (Chairman of the Arthurton Branch) presided and extended a cordial welcome to officers of the Department and delegates from district Branches. Mr. C. H. King (Mayor of Maitland) extended a civic welcome to the visitors.

The opening address was delivered by Hon. S. R. Whitford, M.L.C. (Minister of Agriculture). At the instance of Mr. E. Giles, M.P. (Weavers), seconded by Mr. B. Pattison, M.P., a vote of thanks was accorded the Minister for his attendance and opening address.

During the course of the Conference the following papers were read and discussed:—"Dairying," Mr. G. T. Hicks (Arthurton); "Profitable Farming on Small Holdings," Mr. B. P. Dutschke (Kilkerran); "Best Type of Horse to Breed, Suitable for General Farm Work," Mr. T. Bodda (Boor's Plains); "Winter and Summer Fallowing," Mr. S. G. Chynoweth (Boor's Plains); "Economy on the Farm," Mr. R. Burns (Arthurton); "Tractors," Mr. W. Heinrich (South Kilkerran); "Milk Fever," Mr. L. Moar (Paskeville). A large number of questions were included on the Agenda, and these were replied to by Officers of the Department.

Conference carried the following resolutions:—1. "That the 1932 Conference be held at Kadina, with arrangements in the hands of the Boor's Plains Branch." 2. "That this Conference protests against the high charge for handling wool at Port Adelaide by the wool brokers." 3. "That this Conference strongly protests against the high charges for wharfage and haulage at Peninsula ports." 4. "That this Conference suggests that, in view of the difficulty which the farmer has in obtaining authentic information regarding the world's production of his products, we suggest that the Agricultural Bureau establishes, in conjunction with other countries, if possible, an international bulletin to be published every three months."

On behalf of the Northern Yorke Peninsula Field Trial and Show Society, Mr. J. P. Pontifex, Chairman of the Society, presented the following trophies to successful competitors in the Northern Yorke Peninsula Crop Competition:—First prize, H. E. Aldenhoven (Arthurton), silver shield; first prize, Arthurton Branch Competition, O. D. Jericho, silver cup; first prize, Paskeville Branch Competition, G. Meier, silver cup; first prize, Boor's Plains Competition, A. Adams; second prize, S. G. Chynoweth, silver cup.

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[The following papers were read by members of Yorke Peninsula Branches of the Agricultural Bureau at Maitland on April 15th.]

DAIRYING.

[G. T. HICKS, Arthurton.]

Owing to the recent slump in grain prices we naturally turn to other branches of farming in an endeavor to obtain sufficient money to enable us to purchase necessities, and also to assist in paying accounts which cannot be met with the proceeds from grain. Two very profitable sidelines are cows and pigs, which, in my opinion, should be considered conjointly, because in this district we have to rely on butterfat as the main source of revenue from cows, whilst skimmed milk can be fed very profitably to pigs.

Previously, especially in these districts, high prices, and in some cases high yields, encouraged us to neglect sidelines which were considered a tie, and also as being unprofitable because a fair quantity of grain and hay was required, which at that time was expensive. The decrease in value of these sidelines and their products has not been so marked as has been the case with grain. But even with the high price of grain, we would have been amply repaid for feeding some grain to stock and marketing it in the shape of butter, pigs, and calves, or cattle. In this way an export market for dairy products may have been started. Now, this branch of the export trade is practically negligible; in fact, during the lean periods of the year South Australia imports a considerable quantity of butter from other States. Had these branches of revenue been fully exploited, there would be little trouble in allowing grain to remain low, if it ceased to be profitable.

THE BUILDINGS.

When handling cows a milking shed and dairy is necessary. The site for the milking shed should be well drained, or attempts made at artificial drainage. For farm use, a wood and iron shed will meet requirements. The Dairying Regulations recommend brick or concrete floors which can be washed daily. Should the regulations be made so as to enforce this being done, it would fall rather hard on some who are not fortunate enough to have a water tap at the shed. However, such a procedure is advisable, as milk is one of the quickest germ collectors in existence. If dairying is to be practised extensively, a stone, brick, or concrete building would be more suitable than iron. The milking shed should not be close to stables or pigsties. A cool room is advisable for storage of milk, butter, and cream, and also as a separating room.

THE HEAD OF THE HERD.

As soon as sufficient good cows are in hand, a good bull should be purchased, or the services of a good bull obtained. The Government Subsidy Scheme gives encouragement to people to purchase good stud bulls from tested and selected cows by paying one-half of the purchase price to the buyer, two-thirds of which is paid on purchase and one-third at the end of two years, e.g., a bull may cost £30; £15 equals half, £10 is paid on purchase and £5 at the end of two years. This applies to bulls whose value does not exceed £50 and age not less than 10 months. If stud bulls were always used, a far better class of dairy cow would be for sale and in use than is the case to-day, and production would be much higher. I say this because stud breeders are always culling low producers and animals showing faulty bodies or udders. This is not so with "scrub" bulls, which in most cases are a mixture of breeds, and are only used as a means of getting a cow in calf. Some attempt should always be made to have pure-bred animals, and if crossing is adopted, go no further than the first cross. A man may cross a Jersey and Shorthorn. If this is a heifer, use either a Jersey or Shorthorn bull on her. In any case never use a crossbred bull.

THE JERSEY.

I prefer the Jersey. She is small in body and consequently does not require such a large amount of feed for body maintenance as a larger animal. Also, if she is given more food than is necessary, she is more likely to give an increase in production than lay on fat, which is the tendency with the heavier breeds. The strong points with Jerseys are quality and economy of production, but occasionally very heavy milkers are obtained. For the last five years Jerseys have proved superior to all other breeds in herd tests in South Australia, New South Wales, and Victoria. By this I do not mean to say that Jerseys have topped the list in all classes in single tests. Taking the herds right through, Jerseys have averaged higher butterfat than other breeds. Heavy breeds give a few outstanding cows, but there are more of the low producing class in these than there are with the Jersey. In these tests no record is kept of feeding, but had such been done, the Jersey would again have added to her honors. A point often raised is that Jersey calves and cattle do not realise such high prices in the saleyards as heavy breeds. This is quite so, but when economy of production and extra production is taken into consideration, the Jersey will again be the winner. Jerseys can be brought into profit much earlier than heavy breeds and their period of production is much longer.

Cows should be milked regularly, and under no circumstances be left overnight without milking. They should be properly fed and not expected to do their best on pasture alone. A point often raised is that this country is not suitable for dairying, but if one has a good water supply, good chaff, a supply of ensilage and a lucerne patch, cows can be made to produce as well here as in any other part of the State. Of course, these commodities are not all that is required to feed a cow. In addition, bran, crushed oats, and linseed meal are advisable. Also a good cattle lick is advisable, or else some phosphatic material given in the feed. A pamphlet entitled "Feeding for Production," issued by the Department of Agriculture at the price of postage, gives valuable information on feeding dairy cattle. Calves should never be allowed to get too fat, unless intended for market purposes.

PIGS.

A good, well-drained site should be selected for pigsties. Small sties are required for fattening and breeding purposes. Decide whether to breed or fatten and concentrate on one line. If a person can attend to breeding and fattening at the same time, it is much better, because he can obtain the right kind of pig without having to rely on markets for his supplies. The *Journal of Agriculture* for March, 1931, gives an interesting article on recent experiments held at Roseworthy Agricultural College to determine the most suitable breed for curing purposes. In these tests, the Large White was used for practically all crosses. The Large White is at present considered the best for all purposes in England. In the recent experiments the Large York x Mid York carcass was considered the best.

Financial returns per pig ranged between 12s. and 16s. The Large White x Gloucester Old Spot gave the highest return, but worst carcass, also most waste in preparation for curing. The Tamworth x Berkshire gave a perfect carcass. Pigs with dark skin gave the best scald. With a dark-skinned animal there is not the tendency to go red that there is with white pigs. Tamworth x Berkshire showed smallest loss in slaughtering and Large White x Mid York highest. In six lots, the variation was between 22lbs. and 26lbs. Large White x Gloucester Old Spot was the most economical pig to feed, also the fastest maturing, taking 19 weeks, whereas Large White (Pure) took longest, 22½ weeks. Cost of food per pound weight increase ranged between 2.04d. per lb. and 1.58d. Maturing weight was 160lbs. live weight.

The ration supplied was:—Wheat 5 parts, barley 2 parts, peas 1 part. For the morning feed the above mixture was fed with skim milk 4lbs. per pig. In the evening the same ration was given with half-part meat meal. All grains were crushed and mixed with meat meal and mineral mixture and fed dry. Mineral mixture was fed

at rate of 1 per cent. of grain mixture. Ingredients of mineral mixture were:—Superphosphate or ground rock phosphate 40 per cent., salt 20 per cent., charcoal 20 per cent., Epsom salts 5 per cent., sulphate of iron 5 per cent., sulphur 5 per cent., bicarbonate of soda 5 per cent., potassium iodine $\frac{1}{2}$ per cent. Drinking water was always supplied. As much dry feed as pigs would eat was given. Lucerne was fed at the rate of 1½ lbs. per pig per day. Pigs should always be supplied with some material for bedding, and on no account forced to wallow in mud in winter. If a pig likes mud to roll in allow him to have it, but there is no reason why the sties should be a mudhole in which the animals are compelled to remain. Good sheds are required for shelter. When breeding, a sty for farrowing purposes should be provided with a rail so that young pigs may get behind it and not be squashed. This is not always necessary, but is at all times a safeguard. Sows when farrowing should not have long straw, but broken straw or sawdust. When feeding sows, plenty of good milk-forming materials are required. On no account allow a sow, especially a sow with her first litter, to become too fat.

Mr. C. B. Stead (Yorketown), speaking on the question of pig feeding, asked the writer if he favored keeping a supply of food continually in front of pigs. Mr. Hicks' advice was to use a self-feeder, fill it with crushed grain, and allow the pigs to feed at will. In the case of feeding milk, only sufficient that could be eaten at one meal should be fed. Mr. J. J. Honner (Brentwood) expressed the opinion that so far as Yorke Peninsula was concerned dairying should only be undertaken for the requirements of the farm. Mr. L. Slade (Weavers) said the cost of freight from the southern end of the Peninsula to the Adelaide market was so high that it dissipated any profit that there might be in pig raising. He also mentioned the rather rapid change from the once very popular Berkshire x Tamworth Cross to the Large White so much favored at present.

Discussing this aspect of the pig industry, Mr. W. J. Spafford (Deputy Director of Agriculture) said at the present time the Large White was the most important breed of pig in the world. It was the main breed from which the bulk of the £63,000,000 worth of pig products imported in Great Britain each year was derived. Of this huge amount of money £40,000,000 worth was obtained from foreign countries, and if Australia wished to partake in this, they would have to adopt the White Pig.

It was the breed from which the Wiltshire sides of bacon were obtained. The Large White was fulfilling the requirements of the overseas market, and we in Australia, with our very considerable disadvantage of distance from markets, must realise that to share in the trade we must meet the demands of the purchaser and also send pigs of first-grade quality. The principal drawback of White Pigs in this country is their tendency to scald in the hot sun. If, however, the young pigs were allowed to run in the open all the year round, there would be very little danger of scald.

FALLOWING.

[S. CHYNOWETH, Boor's Plains.]

In the wheat belt the summer is practically rainless and the wet season does not begin until about April. The crop is sown between May and June and fallowing begins soon after. Thus, at least three months' wet weather normally occurs before fallowing begins, and four and possibly five months before it is finished. At first, all the rain soaks into parched soil, but sooner or later, especially during heavy falls, the soil cannot take it up fast enough. A good deal runs off the paddocks, and some lies about in shallow pools and evaporates. When the plough is started in July, one has started early enough for first class winter fallow, but even then it is not possible to trap the rain which has run off or evaporated during the three preceding months. That can only be done by summer fallow. Not only does summer fallow catch the early rains, but it is advantageous from several other points of view.

SUMMER FALLOW.

The land is opened up in February, March, or April, and lies bare for 14 or 15 months before it is sown. This method, however, cannot be employed regularly on those soils which cannot be broken up in the absence of rain; but, on the other hand, there are extensive areas which are more easily broken up dry than when wet. On very loose soils it is sufficient, in the first operation, to merely stir the soil 2½ ins. deep with a spring-toothed cultivator, but, if necessary, the plough scarifier, or a one-way cultivator, will do satisfactory work. If the soil breaks up rough, it is desirable to harrow it and then it may be left until after drilling. The early tillage promotes a profuse germination of rubbish when the first rain comes. Sheep should be given access to the paddock, but once weeds get too far ahead, it will be necessary to get rid of them by cultivation. At this stage, generally, a scarifier will be equal to cutting weeds, and at the same time stirring the soil to a depth of about 2 in. or 3 in., but if a light implement is used for the first operation, a plough may have to be used for the second working. Later, as rubbish appears, it must be killed by using the lightest implement that will do the job satisfactorily. As spring advances, the aim should be to create a well-defined mulch of loose, meadow soil about 2 in. deep, overlying a firmly consolidated seedbed. On soils which have a tendency to run together, the mulch should be left comparatively cloddy, but on good loamy soils it can be fairly fine. The effect of the mulch is to reduce to a minimum the evaporation of moisture previously stored in the soil. As summer advances, an occasional "sheeping" of the fallow will suffice to prevent any oats from seeding, but should half an inch of rain fall, it will generally pay to give a quick harrowing to break any crust that may have formed on the surface. It is very important to recognise that a crusted surface is one through which moisture evaporates at a faster rate than through a loose surface. By permitting the crust to remain, the whole of the moisture previously stored may be lost.

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C. F. ANDERSON, Poultry Expert.

In the following autumn, after the weather breaks, the land can be worked up, and then, after allowing sufficient time for weeds to germinate, sown with a combined drill. Further, the germination of wheat is stimulated. There is nothing better for the promotion of a good sprout of rubbish on a paddock than to summer fallow it. Thus, the system can be employed to clean up the dirtiest paddocks on the farm. When a paddock which it is intended to fallow is particularly foul with weeds, it is sometimes found desirable to restrict the first operation to a light cultivation. In this way, the seeds are not buried deeply to become a menace in later years. They sprout immediately and may be destroyed.

As a word of warning to the man who is summer fallowing a dirty paddock for the first time, I would say, do not do it unless you can cope early with the growth promoted, otherwise the paddock may have to be reploughed, and at the best an unsatisfactory result obtained. Rather than attempt to summer fallow all the land it is intended to crop, it will be most economical to treat half in that way and winter fallow the rest, thus the available labor on the farm can be most economically distributed. Some of the heavy work can be undertaken in February and March, when the teams would otherwise be idle, and the balance can be left until after seeding. The practical advantages in respect to weed killing and distribution of labor should stamp the practice as worthy of adoption wherever it can be employed.

WINTER FALLOW.

The time has come when the farmer must see what can be done to increase wheat and hay yields of his holding. Careful cultivation is the principal method of attaining this end. No hard and fast rule for the cultivation of the soil can be laid down on account of the various classes of land that are to be found, even on one farm. It is absolutely essential that every farmer should study and experiment in order to ascertain the best method of working the land on his holding. Generally speaking, ploughing should be commenced as soon as seeding operations have been completed, to allow ample time for rain to play its part in the settling down of the ploughed land. Two to three inches are deep enough for the land in this district to be ploughed. Do not plough the land while it is very wet, for it will be very hard and lumpy when worked back with the cultivator. If the land is turned whilst very wet instead of crumbling as it is turned, it will simply turn in blocks, leaving open spaces under the surface, allowing the escape of moisture, and making an imperfect seedbed.

The next implement to be used is a set of heavy harrows. These should be used before the hard crust has had time to form on the surface. If no weeds appear, and the surface is loose, the land should be left for a time, but if weeds show up, the cultivator should be set to work at once. If weeds are small, use a springtime cultivator, working at right angles to the ploughing, provided the paddocks are suitable; this tends to keep the surface from becoming irregular, as happens with constant one-way working.

The benefits to be obtained by using the springtime implement are:—1. Improvement of the seedbed; the fine loose soil shakes to the bottom, while the coarse and more lumpy soil works to the top, thus enabling one to break it down with the harrows when rain falls. 2. Lightness of draught; 10 horses are able to work a 35-tine cultivator quite comfortably. 3. One man with 10 horses can do a great deal of work with the springtime. The land being left ridgy behind this implement, it has a tendency to prevent drift. If the land is free from weeds and no heavy rain falls, the land can be left until autumn. If, however, rain falls during harvest, every opportunity should be seized of working the land. Summer weeds are bound to come, and the quickness of growth will cause no end of trouble. If weeds are strong and thick, use a bridle cultivator with 6in. shares or a disc cultivator.

Should rain fall at the beginning or up to the middle of April, it will give ample time to allow germination of weeds, and the land can be worked over before seeding. Land at seeding time should be cultivated as shallow as possible, in order not to injure the seedbed, and yet deep enough to destroy young weeds. Wheat should be drilled to a depth of 1in. to 1½in. and harrowed with a light set of harrows about three days

behind the drill. For this district, the month of May is the best seeding season, and will give best results if sown in June. Later on, the ground is too cold, the seed takes longer to germinate, and the plant is weak when cold wet weather sets in. The earlier sown crops, however, will have firmly established themselves, and will be prepared to fight against hardship. Let us all try and improve our system of cultivation. Each year do a little experimental work of this class. Read and study all papers on this subject, then we will be able to realise what there is yet to learn on this most important question.

"The paper contributed by Mr. Chynoweth is one of the best on the general principles of soil cultivation that I have heard at an Agricultural Bureau Conference." In these terms Mr. W. J. Spafford (Deputy Director of Agriculture) congratulated Mr. Chynoweth on the paper that he had presented to the Conference. Only on one point did he disagree with the writer; that was to his references to the value of the springtime cultivator for soil working. It was nothing but a glorified harrow. To successfully grow wheat, the farmer should maintain a level seedbed underlying the loose surface soil, and there was no springtime that could do that. Referring to summer following, Mr. Spafford said it was worth while where land is very weedy and on those farms where livestock were not kept in any great numbers. In the reverse case, where large numbers of livestock were carried on farms in South Australia, the value of the feed grown on the land would more than compensate for any increase in crop that might be obtained as a result of summer following.

THE BEST TYPE OF HORSE SUITABLE FOR GENERAL FARM WORK.

[THOS. RODDA, Boor's Plains.]

There is, in my opinion, only one horse suitable for general farm work, and that is the Clydesdale. Uniformity of type has long been a marked characteristic of the Clydesdale, and there is no breed of heavy horse so famous for its quality, cleanness of joints, hardness of bone, cleanness and correct setting of hock, and length and slope of pastern, whilst, as for action, the Clydesdale is unrivalled. Main points required when purchasing or breeding this type of horse:—

The height should range from 16½ hands to over 17 hands, and when fully matured, should be evenly balanced. Viewed from the side, the body should show plenty of depth and from the front or rear should appear broad and thick. The depth of body, through the chest, and the length of the leg, should be much the same, which proportions would give an animal a "low set" appearance, bringing his weight comparatively close to the ground, thereby enabling him to use it to the best advantage.

The head should be in proportion to the body: neither unduly large nor too small, with little superfluous flesh. The face may be straight or slightly Roman nosed, the contour of the former being the most pleasing. There should be plenty of width between the eyes, and the forehead should be slightly arched, tapering away from above the eyes to the poll. The ears should be pointed, of medium size and thin of texture, having a covering of fine hair.

The neck should be of moderate length, muscular yet not too thick, arched and well laid into the shoulders. A good head, neck, and shoulders denote character, giving the animal a good outlook.

The shoulders should slope at a good angle. A straight-shouldered horse, when used in heavy work, has an inclination to foot trouble. They should be fairly wide, well muscled, and the top should be carried close to and tapered into the back. The arm of the Clydesdale should be comparatively short, wide, and muscular. It should form a strong support to the shoulder, extending well back and close into the body at its rear part. This places the leg sufficiently under the body to give the desirable position and action. The knee, viewed from the front, should be broad and flat, tapering to the cannon, and, viewed from the side, should show a straight direction and not back.

The cannon should be long, wide, flat, lean, and shaped like the back of a razor. *The tendons* should show prominently. The long hair or "feather" should spring from the back of the tendon, and not from around the sides of the cannon. It should be soft

to the touch and straight. *The fetlock* should be wide viewed from the side, and narrow viewed from the front, fine and well directed. *The pastern* should be fairly long and sloping, to relieve concussion, in the course of action. A horse with a short, upright pastern has a more stilted gait and a greater tendency, when in action, to bring the toe to the ground before the heel, and when worked on hard roads, the legs tend to swell. Foot diseases are more common in horses having upright pasterns than on those of greater slope. A good, sound, healthy foot is essential, and in this respect the Clydesdale holds pride of place amongst draught breeds. A good hoof head, with wide open heels, and strong quarters, is essential, otherwise a horse has a tendency to develop unsoundness.

The chest should be deep, wide, low, and of large girth, indicating strong constitution, with ample space for the vital organs. The back should be short, broad, and strongly supported, and slightly inclined upwards toward the rump. *The loin* should be short, wide, and strongly muscled. This portion of the back should be as wide as possible, and the ribs long and deep, well sprung, and close together.

The hindquarters are the great source of driving power. The hips should be wide (but in harmony with general body proportions), and well muscled. *The rump* must be long, as seen from the side, wide as viewed from behind, and with attractive yet sloping arch from hips to the setting of the tail. It is important that the tail be attached high. *The thigh* should be short, but heavily muscled. *The hock* is one of the most important points in the body, as it is in this joint that the strain on the muscles, during action, is concentrated. The hock, therefore, should be broad viewed from the side, and narrow viewed from the front, its point being prominent, and the joint as a whole well supported by a wide cannon below. The hocks should be turned in slightly, and be fairly close to each other. The hind cannons, like the front ones, should be broad and thin, and they should be perpendicular or but slightly sloping forward. When they are too far forward they bring about a condition known as "sickle-hocked." The hind fetlocks, as in the case of the front ones, should be wide, whilst the pasterns are less oblique than those of the forelegs. The hind feet are somewhat smaller than the front ones, not so round, but with good hoof heads, and wide open heels. The hind legs, like the front ones, should be properly set into the body, not on the outside of the quarters, but well under, so that the muscles on the quarters project wider than the muscles on the thighs; the latter should be fairly close together, not straight down, but incline to the rear of the animal, and the toes of the hind feet should incline slightly outward. There should be a good length from the point of the hock to the ground.

The action of the Clydesdale should be even; that is, his fore and hind action should be in unison. He should plant his hind feet forward as deliberately as his fore ones, which should be evenly carried forward. In trotting, the horse should bend the legs at the knees and hocks, and, from a hind view, the inside of the hoofs (or shoes) should be seen at every step.

It is unreasonable to expect that farmers can purchase all their requirements of this type of horse. The best way is for them to secure one or two good mares, and breed only from high class sires. If unable to purchase the mares, farmers should select the best they have and mate with high class sires. In this way they will soon have a better type, and one which will be faster, and therefore do more work than those we find on the average farm at present.

MILK FEVER.

[L. H. MOAR, Paskeville.]

Milk fever is a common and, until fairly recently a frequently fatal disease affecting cows in all large dairying districts of this and other countries. As it usually attacks the best milking members of the herd, and at a time when the milk flow is heaviest, the malady is one which has caused very severe losses to our dairying industry. It is, therefore, of the greatest economic importance that every dairyman should acquaint himself

with the simple and easy method of treating the complaint successfully by means of filtered air injected into the udder. This form of treatment is comparatively new, and it is so very simple and successful that every dairyman should obtain a suitable apparatus (one containing a minimum of rubber) and know how to use it; in case of emergency an ordinary bicycle pump and nipple from tube (well sterilised) will answer the purpose admirably. With this, however, the air is not filtered, and there is a danger of injecting germs as well. The operation does not require the services of a veterinary surgeon, but the advice of a professional man may be of great value, in the case of complications.

The common name of this malady, "Milk Fever," is erroneous and misleading. In reality, fever is usually absent; instead, there is generally a reduction in temperature. There are a number of names for the complaint, *i.e.*, calving fever, parturition fever, etc.

Milk fever is a disease of well nourished, heavy, milking cows; it usually occurs during the third to fifth calf, and may be easily recognised by the suddenness of the attack, the complete paralysis of the animal, and the loss of sensation, which follows closely the act of calving or parturition, and death usually follows in 12 to 24 hours if not treated quickly. One attack usually predisposes the animal to a recurrence of the disease. The complaint may occur at any period of the year, but is most common in the spring. Other animals seldom have the complaint.

There are few diseases among animals regarding the exact cause of which more widely different theories have been advanced than that of milk fever. The causes may be divided into two kinds: predisposing and direct. Experience shows one of the most prominent predisposing causes to be the great activity of the milk secreting organ—the udder. This organ is most active after the fourth, fifth, and sixth calves, and this is the time of life when the vast majority of cases occur.

The disease is almost unknown in heifers with the first calf, and decreases steadily in frequency after the most active milking period, namely, the sixth calf, has passed. It is rarely, if ever, met with in pure beef breeds, such as Shorthorn, Angus, and

Metropolitan Abattoirs, Adelaide.

MANUFACTURERS OF

Meat Meal for Pigs.

Read Report of trials made by PROF. PERKINS, *Journal of Agriculture*,
January and July, 1921.

Meat Meal for Poultry.

For full information on above write to

The GENERAL MANAGER, Metropolitan Abattoirs Board, Box 573E,
G.P.O., Adelaide.

ALSO MANUFACTURED—

Blood Manure

Bone Manure

Hereford, while it is very common in the heavy milking strains, as the Holstein, Jersey, and Guernsey. There are many theories regarding the direct cause, such as the absorption of toxins from the uterus, which causes paralysis, but nothing definite has been ascertained.

DIAGNOSIS.

This disease in its typical and most common form is comparatively easy to diagnose and easily recognised. It usually comes on about two days after calving, and seldom occurs after the second week. It has been known to occur a few days before calving.

At the onset of the attack there is usually excitement; the cow is restless, treads with hind feet, switches the tail, stares about, or walks uneasily and unsteadily and shows colicky symptoms. This is followed in a few hours by the coming paralysis indicated by a staggering gait, especially in the hind legs, and by weakening of the knees and fetlocks of the front legs; the animal becomes quieter, and staggers more, and becomes weaker; it ceases to worry about its calf, and finally goes down, and is unable to rise. The cow lies perfectly still with eyes partially closed, and the sense of feeling vanishes. Flies can swarm on the eyes and anywhere on the body and are unnoticed. While down, the patient assumes a characteristic position, which is of great assistance in diagnosis. The head is turned around to the side—usually the left—and rests on the chest, causing a peculiar arching of the neck. If the head is drawn straight, it immediately drops back again when released. The body usually rests lightly on one side, with the hind legs extended forward and outward, and the fore legs doubled up in their usual position. There is paralysis of the muscles of the throat, so that swallowing is impossible, and if drenching is attempted there is great danger of fluids going into the lungs and setting up pneumonia. In fatal cases the animal may remain perfectly still and die in a comatose condition from complete paralysis of the nervous system, but more frequently there is some agitation and excitement prior to death with tossing of the head. Death, like recovery, usually sets in from the eighteenth to the seventy-second hour after the onset of the complaint.

TREATMENT.

Anderson and Schmidt were the discoverers of the simple treatment, and they found the usual period of recovery to be about six hours, and very few cases required a second injection, and only an isolated case a third. Previous to the air injection, the hands of the operator and the udder of the cow should be thoroughly cleansed. The latter must be kept from coming in contact with the ground. The tube should be boiled for some time before it is placed in the teat. When fully prepared for the operation, carefully insert the tube into the teat, and pump air into it, while gentle massaging will assist the air to enter right into the full depth of the udder. The quarter should be well distended and care taken to prevent the air from escaping by tying a piece of broad tape around the teat. The other quarters of the udder should be treated in a similar manner.

In case the air is absorbed, and no improvement is noted within about five hours, the treatment should be repeated. The cow is usually able to get up on her feet within an hour (sometimes a quarter will suffice), and soon after the tapes should be removed, as the tips of the teats are then able to retain the air. The animal should not be milked for about 24 hours. The calf should not be allowed to suck. While this method is an easy one for the dairyman to adopt, he cannot expect to have the same results as a veterinary surgeon. In many cases it will be found that the injection of air into the udder will be sufficient to combat the disease without other treatment, but it is always advisable to study the symptoms of each individual case and administer medicine accordingly.

As a preventive, it has been found that by allowing a small quantity of milk to remain in the udder after each milking for about a week after calving, that the number of cases of fever has greatly diminished.

PROFITABLE FARMING ON A SMALL HOLDING.

[B. P. DUTSCHKE, Kilkerran.]

Farming is a business, and the successful farmer (on a small or large holding) must first of all be a business man. He follows his vocation primarily for the profit he can make out of it, and therefore he, like other business men, should aim to get the greatest possible returns for labor and money involved. It is not enough to simply grow crops; they must be produced to yield a profit on the money invested. To succeed in this respect, the farmer must be thoroughly acquainted with every detail of his occupation and endeavor to prevent needless waste, but at the same time he must remember that it is a good business principle to spend a pound whenever he can see that it will come back to him with interest.

Agriculture is Australia's primary industry; therefore the welfare of our country is largely dependent on the man on the land, and if he fails in his work, the result would be disastrous. It should, therefore, be the objective of every farmer to utilise his land to the fullest extent. This can be done by working the land judiciously and by following a proper system of rotation cropping. The intelligent and deep-thinking farmer will always try to devise ways and means by which to work his farm more economically, efficiently, and profitably.

A farm containing 500-600 acres could be called a small holding, and would be large enough for one man to make a good profitable living and bring up a family, provided the land was of good quality and in a district which had a good rainfall. Of course, 500 or 600 acres might hardly be sufficient for one man to carry on profitably in a district consisting of light soil and also with a light rainfall. However, the farmer who has a small farm in a poor district may still be able to carry on profitably, but it is evident that a farm in a district which contains first-class soil and a good rainfall would return greater profits, provided it was properly managed. Low yields are not always due to poor soil and lack of rain, but very often to bad management and lack of agricultural knowledge.

The holdings should vary according to the class of soil and rainfall in the different districts. In a locality containing fertile soil 500 or 600 acres may be considered a small holding, whereas in another part where the land is less fertile 700 or 800 acres would be called a small farm. However, whatever the acreage may be which constitutes a small holding, to farm profitably on such a holding, the farmer must take a keen interest in agriculture and not go about his work in a haphazard manner and trust to luck, but put his whole energy into the business. A 500 or 600 acre farm could be worked by one man, and if the work is done properly, it should be sufficient to keep him out of mischief. Consequently, the man on a small holding is not forced to employ labor, which, except at harvest or seeding time, is nowadays a big and very often an annoying item.

It is of vital importance that the plant should be in comparison with the place. The purchasing of large and expensive implements for the sake of finishing a few days sooner would hardly be a payable proposition, but nevertheless, the plant should be kept up to date. All machinery, farm buildings, fences, &c., should be kept in good order; this also tends to profitable farming.

There are two methods of farming well known to us, namely, horse and mechanical power. Tractors are to be found on most farms, although there is a general tendency for farmers at present to return to horses. The farmer dependent on horse power should not keep more horses than are required to work a small farm; unnecessary horses require feed and attention even whilst idle. A team of 10 to 12 good horses would be sufficient to do the work on a 500 or 600 acre farm. Likewise, the man who is solely dependent on mechanical power to work his farm should buy that type of tractor which is best suited for the class of soil in his district, and has some of the main features which a tractor should have, such as durability, accessibility, power, and so forth. Of course, care should be taken not to purchase a bigger tractor than is required to do the work on the small holding. At the present time, tractors have displaced horses on many farms, but owing to the present high price of fuel, tractors are costly to run and

depreciation is heavy, and it is problematical as to whether the work on the majority of farms, particularly the smaller ones, could not be more profitably carried out with the use of horses.

THE VALUE AND IMPORTANCE OF SIDE LINES.

A small but good flock of sheep would also add to the profits of a small farm. Every farm, whether large or small, should have its flock of sheep. They are not only valuable as far as domestic purposes are concerned, but they are also of great value in keeping the land clean. Sheep are very little trouble, and if properly fed will return a handsome profit from the selling of lambs and wool. The most popular system of agriculture is mixed farming, and this can also be adopted with success on a small holding.

On account of the exceptionally low prices ruling for our main products, wheat and wool, the farmer will be compelled to pay more attention to side lines. With the modern machinery and scientific methods we now have at our disposal, farming on a small holding is quite profitable. Science has done much to explain how the fertility of the soil can be conserved, and with the application of scientific methods to the farming of the future, still greater and better results may be achieved. One of the most common faults among farmers is the accumulation of more land than they can properly cultivate. Many thousands of Australian farmers are struggling to-day under a heavy load, mainly interest on mortgages granted in payment for land purchased in addition to the original farm. Had the farmer been content with a small acreage, the position would not be so acute. It would certainly be a benefit to Australia if the farms were smaller, thus peopling the country and creating a greater market for home consumption. It would improve the social life in the various communities and make country life more interesting. Any step taken towards populating the country and increasing production is a step towards strengthening and consolidating Australia and the British Empire, and it is the only way that a hold can be kept on this country.

If Australia wants to keep her place in the world's markets, producers will have to cut their costs of production, and at the same time increase production by using scientific methods. A sure way to reduce costs of production is to increase the yield per acre. As with the factory, so with the farm, i.e., the greater the volume of production the less the cost per unit or bushel. Mr. Scullin urged the farmers to grow more wheat, to which they readily responded; but the trouble is that farmers usually use more, and not less, acres on which to do it, and instead of decreasing they increase the bushel production cost. It is a known fact that small acreages, more intensive cultivation and fertilization, bring about bigger yields and larger profits, for it is intensive and not extensive cultivation that pays best. A farm capable of producing 50bush. per acre which only grows 20bush. is an unsound economic unit. We must fertilise sufficiently, otherwise we do not farm as well as we can. It has been said that good land is like a good bank account—the more you deposit in it the more you can draw out. Yet some farmers do not realise this and follow mining methods rather than farming methods, and soon deplete the soil. It is undoubtedly a most short-sighted policy and should not be practised.

One of two things must happen if production is to continue in this country in the future: either prices received by the farmer must be higher or the cost of production lower. Unfortunately, many farmers will be unable to put in a crop this year unless they receive monetary assistance. Seasons come and go, and the land has to be cultivated and drilled. All who possibly can should put in a crop, and it seems the only way in which we can meet the situation is to endeavor to produce our crop as cheaply as possible. But some one may say, "What is the use of producing more of a crop that is unsaleable at anything like a remunerative price?" The answer, of course, is the higher the yield of any particular crop the less cost to the farmer, and consequently the less the loss on that particular land. The present state of affairs is an incentive for the farmer to make certain he obtains the highest possible returns from the land he has under cultivation.

Do not despise the small fields and crave something bigger, not realising that you have as much as you can properly care for. Save the fertility, renew it, treasure it. It is the source and support of our agricultural wealth and our national greatness.

ECONOMY ON THE FARM.

[R. H. BURNS, Arthurton.]

The subject under discussion is one which calls for very serious consideration in view of the serious depression which is by no means a local trouble only, but has become almost world wide. Opinions differ as to how long we may have to wait before things will adjust themselves, but it is generally recognised by prominent business men that it will take five years to establish business on a sound footing again. We surely are justified in expressing the hope that the unsatisfactory financial position is now at its worst, and that the period of reconstruction will commence forthwith. The better times to which we are looking forward can be either hastened or delayed by the method adopted by those to whom our destiny is largely entrusted. While Governments and the powers that be must of necessity play a big part in this scheme of reconstruction, it must not be overlooked that the country is almost entirely dependent on the efforts put forward by primary producers. Overstocking should be very carefully guarded against, and farmers should make sure that they have a plentiful supply of fodder; it is better to err on the side of understocking than run any risk of having stock above the number which one can keep properly fed. In these days of low prices it appears imperative that we undertake a system of mixed farming, making cereal growing, of course, the main object.

Economy consists in getting the best return per acre, and the highest price for the produce, not in getting the largest area under crop at the least outlay. Sidelines are of utmost importance, and these should be handled in a systematic way. Pigs that are well bred are well worth the extra cost, and the same applies to cows, sheep, and poultry, which if properly kept can be a source of income of no mean value, as can be proved if careful records are kept. It behoves all of us in our own interests and that of our country, of which we should be justly proud, to practice the utmost economy, and by diligence win our way back to prosperity.

DAIRY CATTLE IMPROVEMENT ACT, 1921.**SALE OF PUREBRED BULLS**

Dairymen are again reminded that on and after July 1st, 1931, no bull will be accepted for sale under the Government Subsidy Conditions unless its dam has qualified under the present butterfat standards. It is suggested, therefore, that persons who desire to sell, under subsidy, bulls which are eligible only under the old standards, should effect the sales at once.

DEPARTMENT OF AGRICULTURE.

MAY 1st, 1931.

People generally are beginning to realise how much the country depends on the products of the soil, and the farmer has seriously to be regarded as a national asset.

The prosperity of Australia undoubtedly depends largely on the size and value of her exports—wool, wheat, and fruit forming by far the greater part of Australia's export products.

As the farmer is obliged to sell his goods in the open markets, and thus has to compete with the many countries which can boast of big wheat-producing areas within easy distance of the great populations of the world, it can be readily seen that the farmer's only hope in an attempt to retrieve his position is to co-operate wherever possible in the handling of his goods, both as a buyer and seller, and do his utmost on the farm to economise and thus reduce the cost of production.

The salvation of the wheat industry can only be brought about by a fixed determination on the part of the farmer to stick to his guns—or his ploughs—and carry out a very careful system of economy.

It is imperative that we should avoid all waste during years of plenty and when money is plentiful. It seems to be one of the laws of human nature that we grow a little careless and actually waste at times what at some future date we wish we could have returned to us. Feed is wasted which could have been stored, and were this practised, if only in the matter of building a stack of straw each year in the flush periods, South Australia would never be faced with the atrocious losses which accompany the droughts which periodically leave such devastation in their trail.

The purchase of luxuries has been overdone in the past few years, whether they adorn the inside or the outside of the home, and it is necessary to guard against over-capitalising the farm, and where practicable to build up reserve funds for lean periods.

The successful farmer must at all times be prepared to have on hand efficient and up-to-date machinery. It is false economy—and this must be avoided—to refrain from this necessary outlay and continue with obsolete machinery which must in the end prove a fruitful source of waste, at least indirectly. It is not advisable to purchase surplus machinery, as this would mean so much money lying idle, and this represents quite a handsome sum in these days of high-priced implements.

Neglect is one of the chief causes of leakage in the costs of production. Valuable machinery is often purchased and is not provided with suitable protection immediately it has done the season's work. The purchase of paint and its application is an important item which farmers generally are apt to overlook. Repairs to machinery are so often of the makeshift variety, and temporary repairs are so often regarded, when once fixed as permanent, that the time comes all too soon when the farmer is faced with a big repair bill, because he did not immediately procure the correct replacement.

The systematic use of good oil for the different machines plays a very great part in economy, and when a man boasts of the small quantity of oil he uses in a season it will generally follow that he is faced with the expense of new machinery, while the careful man finds his machine good for many more seasons—the extra time and money spent on lubrication is well worth while.

The motor car and lorry play such a prominent part on the farm to-day, and their purchase and upkeep represent such a large sum of money, that the farmer is obliged to practice the strictest economy in regard to the operation of these units.

Most of us are guilty of using our cars more than we should in view of the times, but by paying careful attention to tyre inflation, oiling, and keeping repairs to a minimum, running costs can be considerably reduced. Fuel consumption is a most important item, and the careful adjustment of the carburettor, coupled with careful driving, can reduce considerably the cost of this particular means of transport. The tractor which on many farms to-day plays such a great part in production, needs the utmost care and attention in view of the heavy work expected of it. From experience I have learned that by a systematic overhaul twice a year, and the use of a good quality oil, changed at the correct periods, and loads kept within reasonable limits, a tractor will perform many years of useful service. Here again the careful adjustment of the carburettor can mean a considerable saving on a year's operations.

"LUCERNE-GROWING IN SOUTH AUSTRALIA."

[By W. J. SPAFFORD, Deputy Director of Agriculture.]

(Continued from page 953).

UTILISATION OF THE LUCERNE.

Not only does the Lucerne crop produce a very high tonnage of dry matter per acre, and much more total digestible nutrients than do most other forage crops, but the forage is so very rich in digestible protein that it is specially valuable for certain of the domesticated livestock, and if the most is to be made of this foodstuff it should be utilised in a proper manner. Although very heavy yields of forage are secured from the crop, the stems of the Lucerne plant are comparatively fine, and so it offers no physical difficulties to any class of farm livestock, all being able to eat it without discomfort, in any stage of its development. For the same reason, it can be easily made into hay, without the cured material being in any way objectionable. The crop can be manufactured into and stored as silage, but as it is so very rich in protein, and the losses of protein in ensilage-making are fairly high, it is on the whole much too valuable a crop to be stored in this way, unless it is the principal forage crop grown, and stored succulent fodder is needed on the farm. All farm livestock do well on Lucerne, either in the green state, as ensilage, or as hay, but because of its high protein content it is an exceptionally good forage for the production of milk and for young growing animals, and is more suitable for this purpose than for the fattening of livestock, although it does this readily in a warm climate, such as is ours.

That Lucerne is a high-class forage is easily seen, by an inspection of the following Table, where its composition and digestibility as green forage, ensilage, and hay are compared to other well-known foodstuffs.

MEGGITT'S LINSEED MEAL.

The seasonal reduction during certain months of the year in the output of milk, cream, butter, and cheese, can definitely be checked by the use of Meggitt's Linseed Meal.

Meggitt's is a highly concentrated food, rich in essential milk producing and body building protein, and conditioning linseed oil in the correct proportions.

Sold in any quantity, from one bag (100lbs.) upwards.

Obtainable from any Dairy Produce Factory, Grain or Chaff Merchant, or direct from—

ELDER, SMITH, & CO., LIMITED,

SELLING AGENTS IN SOUTH AUSTRALIA.

TABLE 1.—Feeding Value of Lucerne Forage Compared with Other Well-known Foodstuffs.

Composition.						Digestible Nutrients.					
Water.	Ash.	Crude Protein.	Crude Fat.	Nitrogen-free Extracts.	Crude Fibre.	Protein.	Fat.	Nitrogen-free Extracts.	Fibre.	Starch Equivalent.	
%	%	%	%	%	%	%	%	%	%	%	
<i>Green Forage—</i>											
(a) Oats.....	1.9	2.0	0.6	10.7	8.8	1.5	0.4	6.7	5.1	10.4	
(a) Red Clover	2.0	4.3	0.9	10.1	6.6	3.1	0.6	7.9	3.8	13.4	
(a) Lucerne.....	2.3	4.5	0.8	9.6	6.8	3.2	0.4	6.3	2.9	10.5	
<i>Ensilage—</i>											
(a) Oats.....	1.5	1.6	0.7	9.0	7.2	0.9	0.4	5.0	4.3	8.3	
(a) Red Clover	2.3	4.2	1.2	6.4	6.0	2.8	0.6	4.7	3.2	9.6	
(a) Lucerne.....	2.5	4.4	1.6	5.7	5.9	3.0	0.8	3.9	2.5	10.7	
<i>Hay—</i>											
(a) Oats.....	6.2	7.6	2.4	43.1	30.6	5.9	1.7	27.1	18.4	36.5	
(a) Red Clover	6.5	14.5	3.1	40.0	25.9	9.1	1.8	28.0	12.2	37.2	
(a) Lucerne.....	7.8	17.4	2.6	33.3	28.9	13.0	1.2	22.6	12.1	32.5	
(b) Australian Lucerne	8.0	14.4	1.7	38.2	27.7	10.9	0.8	26.0	11.6	33.3	
(b) Variegated Lucerne	14.2	14.3	2.6	36.8	22.1	10.8	1.2	25.0	9.3	33.9	
(b) Subterranean Clover	9.0	11.8	2.1	46.7	20.4	7.6	1.1	30.8	8.9	37.1	
(b) Clustered Clover .	8.6	11.3	1.7	45.2	23.2	7.3	0.9	29.8	10.2	35.1	
<i>Concentrates—</i>											
(a) Wheat Bran	3.7	16.8	2.7	58.2	8.6	13.3	1.9	41.3	2.2	46.2	
(a) Linseed Cake ...	6.6	33.9	8.7	32.0	8.8	29.1	8.0	25.6	4.3	74.2	
(a) Copra Cake.....	5.6	19.1	12.8	42.5	10.0	14.9	12.4	35.2	6.3	85.4	

(a) European analyses and digestibility results.

(b) South Australian samples.

Even after the proportions of the various nutritive substances are known it is extremely difficult to make a proper comparison of foodstuffs if they are of different types or if they are to be used for different purposes. For instance, it is a fairly simple matter to compare foodstuffs if they are to be used for fattening purposes or for maintaining the condition of the animals using them, provided they do not belong to extreme types, like roots on the one hand and grains or oil cakes on the other, but if the feeds are to be used for the production of fat on some animals and the production of milk by others, the making of a comparison is by no means easy. In this connection it might be pointed out that the nitrogenous part of the foodstuffs—the *protein*—is of great value in aiding the formation and secretion of milk, but as a fattening substance is not so good as the starchy portions of the feed—the *carbohydrates*—and is a long way behind the *fats* of the feed for this purpose. Because of this, some feeds which are comparatively rich in *proteins*, such as the leguminous hays, are especially valuable in the production of milk, but when compared with other hays not so rich in nitrogen, from a fattening point of view, they are no more valuable, and in some cases are less so. In the above table the nutritive value of the various foodstuffs can be clearly seen, because the *Starch Equivalent*, as calculated according to Kellner's method, gives a correct comparison as to the feeding value of similar foodstuffs when used for fattening or maintenance purposes, and the proportion of *digestible protein* shows how valuable they are for the production of milk, &c. Lucerne is seen to be about as good as Oats and Red Clover for fattening purposes, whether used as green forage, ensilage, or hay, and better than either of them for animals in milk, and on the whole is one of the best of the cultivated green forages known in civilised countries.

LUCERNE AS GREEN FORAGE.

Lucerne is easily the best plant for the production of green forage we have yet seen for South Australian conditions, and is particularly valuable for cutting and carting to the animals being fed upon it. It is very eagerly eaten by cattle, sheep, horses, pigs, and all kinds of poultry, and without exception they all do well on it, whether used with the object of producing meat, milk, or eggs.

GRAZING THE LUCERNE CROP.

It is generally recognised that thick stands of Lucerne, making strong, luxuriant growth, either under irrigation or when on a close water-table, cannot be grazed with safety by cattle and sheep unless great care is taken with the animals. Ruminants are very liable to develop "bloat" when grazed on sappy Lucerne, particularly if it is covered with dew or rain, but the danger is considerably less on the lighter stands and weaker, drier growth commonly met with when Lucerne is grown on sandy soils, or on the ordinary wheat-growing lands of the country. It is usually found that cattle or sheep which have access to other kinds of pasture as well as Lucerne, or if they can always get at a supply of dry feed, do not suffer from "bloat" to any great extent. Whatever condition the Lucerne is in, when about to be grazed by cattle or sheep, the animals should be gradually accustomed to it by making sure that they are not hungry when they first go on it, and that they are only allowed to remain for a short while the first day, a little longer the second, and so on, taking about a

week before allowing them to remain the whole time. On no occasion during this process should they be allowed on the Lucerne while it is covered with dew or rain. Dairy cattle and mature sheep are very liable to "bloat," nevertheless they do remarkably well on the forage if carefully watched for this trouble, the cows remaining in full production without the need of other foodstuffs, and the sheep producing wonderful lambs and fattening very readily. Lambs are not at all liable to be affected by "bloat" even when grazed solely on Lucerne. For horses having a spell, or those doing light work only, Lucerne is almost an ideal grazing crop, but it tends to rather loosen and soften horses on heavy work. There are not many forage plants that can be economically grazed by pigs, but Lucerne is an exception to the rule, and when pigs are given a grain ration while grazing the Lucerne, the very best quality of pork is produced. It is almost an ideal foodstuff for brood sows, and if fed to sows with litters they rear their young well, and carry their condition right through. The stand of Lucerne is not injured by pigs unless too many are put on it at one time, or they are left on for too long a time. If no more than 20 pigs per acre are allowed, the Lucerne plants will not be damaged much provided that the pigs are receiving a liberal allowance of grain, but if more are to be used they should be shifted to other plots before they root up the plants.

Grazing the Lucerne tends to shorten the life of the stand, because it is thinned out much quicker than if stock are never let on it, and if great care is not shown this killing of the plants will be brought about very rapidly.

To get the best out of the crop without injuring it:—

- (1) The crop should be well established before stock of any kind are grazed on it.
- (2) The animals should be moved to another field, before they damage the stand.
- (3) After resting the field, the plants should be allowed to make growth about a foot high before stock are again put on it.
- (4) If possible, the crop should be fed down rapidly, and the stock moved on: this can only be done if the stand is divided into small fields.

CUTTING AND CARTING LUCERNE FORAGE.

Where maximum returns are to be got from the Lucerne crop grown for green forage, it should be cut and carted off the land, and livestock should never be grazed on it. This is not always the most economical way to manage the Lucerne crop, but when handled in this way much more forage is produced, the stand lasts a lot longer, and animals do not suffer in any way from feeding on the cut forage. Where dairying is being carried out, all luxuriant-growing Lucerne should be cut and fed to the cows in racks, when the animals will give full yields of milk, and the danger of loss of cows from "bloat" will be done away with. The Lucerne should be cut when the fresh shoots are starting from the crowns, and so long as the cutting is done in a regular rotation throughout the growing period of the crop, very little of the crop will get ahead of the mowers. Poultry can profitably utilise a relatively large amount of Lucerne, particularly for producing eggs, but before it is fed to them it should be chaffed so that there is no waste of such a valuable foodstuff.

LUCERNE AS HAY.

For animals producing milk there is no hay the equal of that made with Lucerne, for it is highly digestible, contains a large amount of protein, ash, and lime, and is so palatable that animals are encouraged to eat large quantities of it. The stems of the plants are relatively thin, and when made into hay they remain tough rather than brittle, and so their size and texture are ideally suited for hay, and are not, in any way, objectionable to farm livestock. The quantity of hay secured, its palatability and digestibility, are very largely dependent upon the time the crop is cut and the methods employed in curing it, and as it is necessary to take certain precautions if a high-class sample is to be manufactured, a knowledge of the requirements in this connection is essential.

WHEN TO CUT THE LUCERNE CROP FOR HAY.

The Lucerne plants must be cut when they reach a certain stage of development, because not only does this control the quantity and quality of the hay received from that cut, but it affects all future cuts, and eventually decides what shall be the life of the stand. Lucerne grows to a certain height, then begins to flower, and at the same time a fresh lot of shoots, which will eventually develop into the next crop, commences to grow from the crowns of the plants. At this time also, the lower leaves begin to fade and soon fall to the ground. Sometimes the plants reach the flowering stage without the flowers actually opening, and they remain with the buds showing for some time, but in the meantime the shoots from the crowns have started. Again, it occasionally happens in cool weather that the lower leaves fade and drop before flowering has started or the new shoots appeared. It is generally recognised now-a-days that the greatest quantity per season of the highest quality of hay is obtained if, before the mowers are put in the crop, the new shoots are allowed to grow just sufficiently high so that they will not be cut off by the mowers. This stage is usually reached when about one-tenth of the crop is in bloom, and so as a rule this indication can be taken, but it is much safer to carefully inspect the crowns of the plants and cut the crop when the new shoots have made some little growth. If the new shoots are cut when mowing, the next growth is usually considerably reduced in quantity and its maturity delayed. Once the leaves begin to fall the stems rapidly become fibrous and hard, so on those occasions when the leaves begin falling before flowers or new shoots appear, the crop should immediately be cut to enable good quality hay to be made and to encourage the next growth. The leaves are much richer in protein, higher in nutritive value generally, and lower in fibre than are the stems, so it is essential that they be saved if at all possible.

TABLE II.—*Analyses of Leaves and Stems of Lucerne.**

	Leaves.	Stems.
	%.	%.
Ash	11.07	8.17
Crude Protein	25.45	12.42
Crude Fat	3.18	1.36
Nitrogen-free Extract	44.50	41.09
Crude Fibre	15.47	38.78

*"Alfalfa Production in Kansas"—R. J. Throckmorton & S. S. Salmon.

When the crop is allowed to pass the ideal stage and reach full bloom before cutting, the hay made is usually fairly good, but the yield secured is generally less during the season, because the next crop does not start away so quickly as one cut earlier.

TABLE III.—**Yields of Lucerne Hay Cut at Different Stages.*

Time of Cutting.	ANNUAL YIELDS.					Mean Yields.
	1922.	1923.	1924.	1925.	1926.	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
(b) Early or frequent cutting	8,100	5,105	5,392	5,392	5,080	5,814
(a) Normal cutting	5,490	5,985	4,860	4,860	5,240	5,287
(c) Delayed cutting	4,750	4,855	4,380	4,380	4,580	4,589

The stage of development of the crop at the time of cutting has a positive effect upon the duration of the stand. Cutting in advanced stages maintained a better stand throughout.

TABLE IV.—**Condition of Lucerne Stands Cut at Different Stages.*

Time of Cutting.	CONDITION EXPRESSED IN PERCENTAGES.					
	1921.	1922.	1923.	1924.	1925.	1926.
(b) Early or frequent cutting	100	100	94	84	80	58
(a) Normal cutting	100	100	95	85	75	65
(c) Delayed cutting	100	100	100	92	88	85

* "Experiments with Alfalfa"—Martin Nelson, University of Arkansas.

(a) Normal cutting was gauged by more or less arbitrary judgment, because the behavior of blooms is not the same for each crop.

(b) Two or three weeks before normal.

(c) Two weeks after normal.

The above tables show that, although more hay is secured by cutting the crop frequently and before it has reached the flowering stage, the life of the stand is considerably reduced. Local experience is the same as that quoted, for it is found that continuously cutting the crop in the bud stage thins it out rapidly. If cutting the crop when immature is only done occasionally the stand does not appear to suffer, but it must not be carried out too often.

TIME OF DAY TO CUT LUCERNE FOR HAY.

It is a matter of common experience with lucerne-growers who make hay that external moisture, such as dew or rain, is harmful if present on the Lucerne any time from the cutting of the crop to the stacking of the cured hay. Because of this the cutting of the crop is never commenced of a morning until after the dew has dried from the plants. Most experienced growers cut the crop in the morning, being careful only to mow an amount that can be cocked, or at least put in windrows on the same day. Where labor is scarce, some growers cut the crop in the late afternoon and rake and cock it the next day before again commencing cutting. As showery, or even cloudy weather, delays the curing of the hay, and often leads to the production of poor quality material, cutting is sometimes delayed until the weather brightens up.

SETTING THE MOWER TO CUT LUCERNE.

In most places it is usual to set the mower so that the crop is cut as close to the ground as possible so as to get the maximum amount of hay, to force the new growth from the crowns instead of encouraging side shoots from the butts of the old stems, and to keep down the wastage of material which follows the cutting off of the short stubs left last time when the mower was cutting too high. Where cold winters are experienced it is usual to raise the cutting-bar of the mowers for the last autumn cut, so that stems about 6 in. in length are left to protect the crowns during the winter, but this is not necessary anywhere in this State. In those places where the soils are fairly saline, or where the irrigation water being used is approaching the danger point as regards salinity, enough stem should always be left to keep the surface of the soil shaded and so reduce the possibility of an undue concentration of injurious salts at the surface.

CURING LUCERNE HAY.

It has already been shown in Table II. that the leaves are easily the most valuable part of the cured hay as far as nutriment goes, and according to J. T. Willard, in the portion of Kansas Agricultural Experiment Station Bulletin 155, "Alfalfa," written by him, good Lucerne hay is composed of 58.75 per cent. stalks, 38.43 per cent. leaves, and 2.82 per



LUCERNE HAY.--Showing the mower at work cutting the hay crop, and the small, easily-handled cocks thrown together immediately after cutting.

cent. flowers, and so everything possible must be done to retain in the hay all the leaves carried by the plants. The leaves dry very readily, become brittle, and easily break off the stems, and so it is not a simple matter to cure the hay with a low loss of leaves, but because of the importance of retaining this portion of the hay, all operations connected with hay-making hinge on this necessity.

The Lucerne is usually cut with a mower, and the cut material is allowed to lie in the swath just long enough to become wilted, or, at the longest, until the exposed leaves are almost dry; and it is then raked up into loose and rather open windrows. If left too long in the swath the leaves become

thoroughly dried while the stalks are still sappy with moisture. When the hay has toughened a bit in the windrow, it is forked into cocks small enough so that they can be handled by one good forkful when carting time comes, or when the cocks must be moved because of excessive rain. The art of making good Lucerne hay depends on exposing it to the sun as little as possible, and allowing the air to do practically all of the curing. In this way hay of good color, sweet aroma, and high palatability will be produced. If exposed too much to the sun it leads to the production of bleached hay from which many leaves have fallen because they were dry and brittle, lowered nutriment and palatability, and loss of weight. If the Lucerne is raked into windrows, before even the surface has dried, and is then forked into cocks whilst still containing a good deal of moisture, the leaves continue to draw the water from the stems, and the whole mass cures evenly. If very hot weather is experienced at hay-making time, the windrows are made soon after cutting, and almost immediately the material is put into cocks, but if good, fairly cool hay-making weather obtains, the Lucerne will be in the swath two or three hours and in the windrows for a full half day. If unfortunate enough to strike cloudy, dull, weather it may take a couple of days before the hay is dry enough to put into cocks, and in the meantime it may have been necessary to turn the windrows over at least on the first morning after having raked them together. Light crops of Lucerne can be raked as soon as cut without any wilting, and in hot weather the material will go straight into cocks. The hay should not be put into cocks when covered with dew or rain, as there is a good chance of it developing mould. On irrigated land, or after a rain, it is often wise to move the cocks a couple of hours before stacking, so as to expose the damp hay on the bottoms, and so dry that portion. The hay is ready for carting when still tough and slightly damp to the feel, but if a handful is tightly twisted no moisture should be exuded from the stems. When it is necessary to make the hay in the most economical method possible all of the curing is done in windrows, and the labor of making cocks is dispensed with, in this way much time is saved, because in good weather the hay will be ready for stacking in from one to two days, whereas if cured in cocks it would probably take twice as long. If much rain falls during the curing process it often pays to leave the cocks until the outside dries, then shift them to a new spot alongside; breaking up the cocks and exposing the inside of them will lead to better drying, but more surface is exposed and many leaves are lost. Hay exposed to much rain is greatly damaged by moulds and fermentations and by the dissolving of soluble substances, as is clearly shown by the following figures obtained at Colorado Experiment Station, after three rains, totalling 1.76in., had fallen during curing:—

TABLE V.—*Losses Caused by Rain Falling on Lucerne Hay.*

Hays.	Weight of Hay.	Ash.	Protein.	Fat.	Nitrogen-free Extract.	Fibre.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Original	100.0	12.2	18.7	3.9	38.7	26.5
Damaged	68.3	8.7	7.5	2.6	23.0	26.5
Losses	31.7	3.5	11.2	1.3	15.7	Nil
Analysis of damaged hay ..	100.0	12.7	11.0	3.8	33.6	38.8

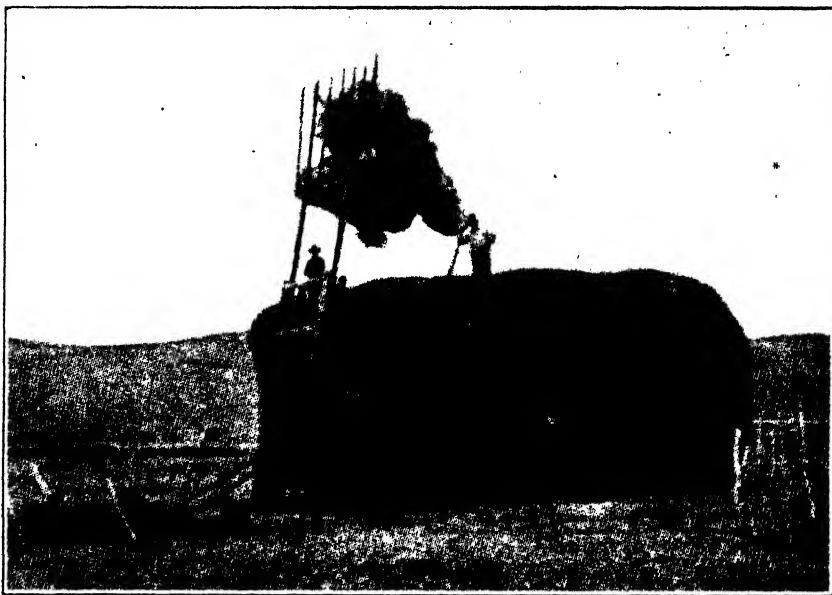
*Figures quoted by J. T. Willard in Kansas Agricultural Experiment Station Bulletin 155, "Alfalfa."



LOADING LUCERNE HAY.—A mechanical loader picking up the hay.

STACKING THE LUCERNE HAY.

Great care is necessary to see that Lucerne hay is stacked when in the right condition as regards moisture, because if too dry much of the most valuable part of the hay—the leaves—is lost, and if too moist there is the danger of the development of decomposition and moulds, and in extreme cases it may lead to spontaneous combustion. It is usual with the best hay-makers to stack the hay as soon as it is possible to do so, and a common test is to take a handful of the hay from the centre of a cock and twist it very tightly, and although it may feel moist to the hands, if no sap is squeezed from the stalks it is considered perfectly safe to stack.



STACKING LUCERNE HAY.—A high-lift mechanical stacker being used to stack lucerne hay.

Hay wet with dew or rain should never be stacked, because it is even more likely to heat than if damp through being insufficiently cured; in this connection it is sometimes said: "Lucerne hay is more likely to suffer damage from moisture *on* it, than from moisture *in* it." Whenever possible Lucerne hay should be stored in sheds in preference to being stacked in the open. This provision is warranted because it is such a valuable foodstuff, and one which does not shed water well, and if stacked in the open it is necessary to thatch the stacks in some way. Wherever stored it should not be placed directly on the ground, for if this is done there is some loss through drawing sufficient moisture from the soil to lead to decay, and so dunnage or a layer of straw should first be put down on which to build the stack. In stacking in the field, with such a material as Lucerne hay, which rather tends to keep loose and open, it is absolutely essential that the middle of the stack be kept about 3ft. higher than the edges, all the way up from the ground until the roof is being built. When this is done the material slopes towards the outsides when settling, and then even if rain does get into the stack it will be led to the outside.

Where large areas of lucerne are grown for hay, most of the hay-making and stacking can be done by machinery. The hay is picked up by a

mechanical loader direct into the waggon, and is put into the stacks by an elevator or high-lift stacker.

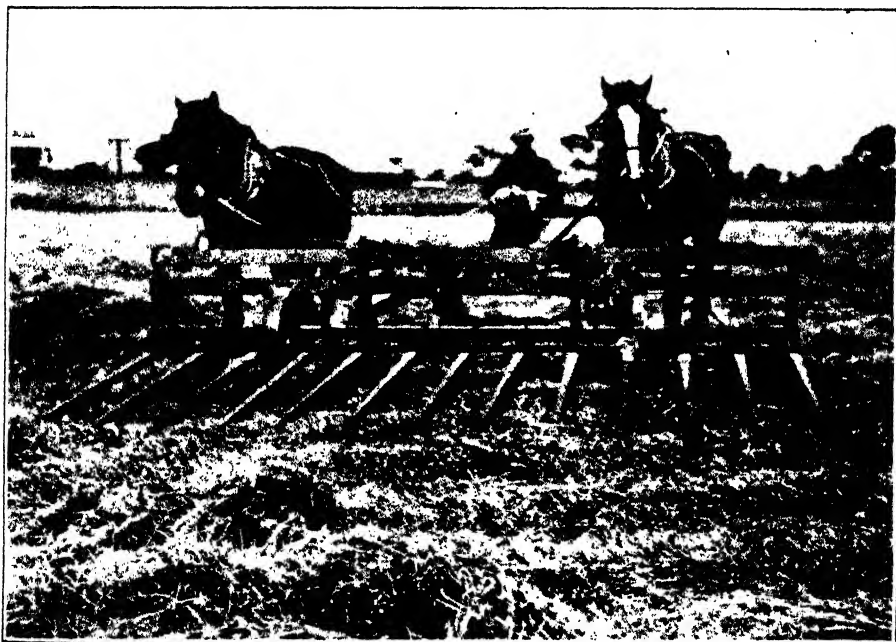
If hay is stacked with a little too much moisture in it a slight fermentation will take place and the material will be of a brownish color instead of a bright green. This brown hay is relished by livestock, and some dairymen claim that better results are secured from milking cows fed on it than if ordinary green hay is used.

For home use there is very little disadvantage in some brownish coloration developing in the stored hay, but if the hay is to be sold it is essential that it be of a normal green color.

Some hay-makers follow the practice of sprinkling coarse salt throughout the hay during the operation of stacking, and although this is advantageous where poor quality hays of various kinds are concerned, to improve their palatability, it is not necessary for well-cured Lucerne hay. On the other hand, if there is any danger of an excess of moisture leading to fermentation in the stack, the presence of the salt reduces the risk of damage from this source. It is usual to sprinkle the salt into the hay at the rate of from 14lbs. to 28lbs. per ton of hay.

BALING THE LUCERNE HAY.

Where Lucerne hay is grown for sale, or when it is desired to cart it long distances, it is often the most economical method of handling, to press it into bales in the field where grown. The baling press is taken to convenient spots in the field, and sweep-rakes bring the whole cocks of hay,

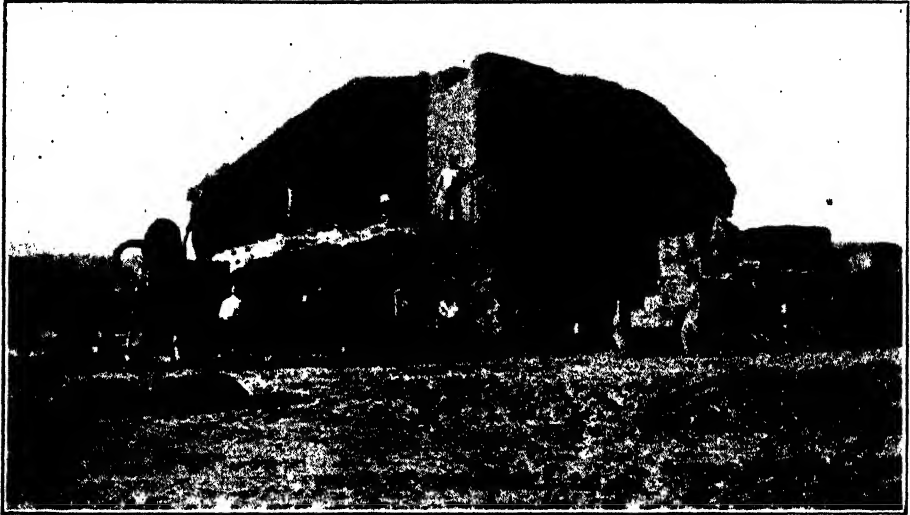


LUCERNE HAY.—A push-rake helps considerably in handling the cured hay, especially in bringing the cocks to the press, when baling the hay in the field.

or loads from the windrows, right to the press, and it is there and then made into bales. Before the hay can be baled it must be dry enough to stack, and no risk can be taken of excess of moisture being present, because partially cured hay is always spoilt in the bale.

YIELDS OF LUCERNE HAY.

In the good lucerne-growing parts of the State, where the crop is grown specially for hay, the average yield should be about 5 tons per acre, being something over 6 tons per acre from the better fields in the irrigated districts, and around 4 tons per acre where it is grown on a close water-table. In these places the variation in yield from year to year is not very great, but where the crop is dependent upon the rainfall, or the water-table is a long way from the surface, or the underground water is very saline, the yield varies a lot according to the season. In districts where the average



LUCERNE HAY.—Pressing well-cured lucerne hay into bales at Wood's Point, South Australia.

annual rainfall exceeds 16in., and good cultivation and liberal manuring are practised, at least 1 ton of hay per acre per year should be expected, and some months of grazing as well. In sandy soils on a water-table not too far down, besides a ton of hay per acre, this grazing should be really good in most years, and should last for about five months.

FEEDING THE LUCERNE HAY TO LIVESTOCK.

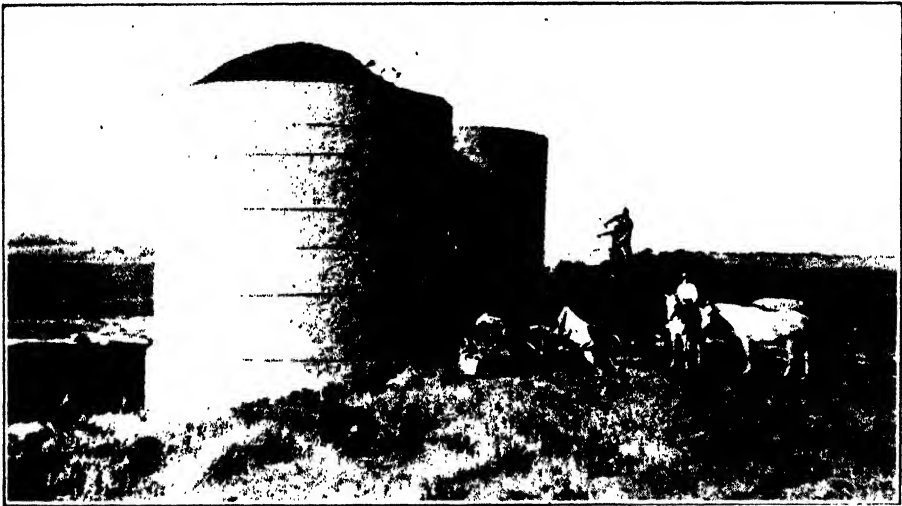
For dairy cows and all other farm livestock producing milk, there is no hay made in a hot climate that can be compared to Lucerne. It contains sufficient digestible protein and lime to fulfil the requirements of milk production, is liked by the animals, and can be fed by itself without the stock becoming tired of it, and without them suffering in health or vigor. It should be fed to cows and sheep as long hay in racks, there being no need to chaff or otherwise treat it in any way, as is necessary with most other hays. For pigs and horses it is unnecessarily rich in protein, so should always be fed in conjunction with foodstuffs containing more carbohydrates. Pigs do much better if fed on Lucerne hay and barley or wheat than if the grain alone is fed to them. The most economical way to feed the Lucerne hay to pigs is to supply it to them in strongly constructed racks and allow them to take all they desire. If at the same time the pigs get their grain from a self-feeder, they will develop very rapidly, and produce pork with the correct proportion of lean to fat. Horses

waste much of the valuable protein in digestion, if fed on Lucerne hay alone, so it should never form more than part of their ration. From 10lbs. to 15lbs. of Lucerne hay is sufficient for any horse, if he is also receiving other foodstuffs. For working horses most feeds of Lucerne hay can with advantage be given as chaff. Lucerne-hay is a good foodstuff for poultry, and in most cases will cheapen the cost of the eggs produced.

Lucerne meal should always be bought on a guaranteed analysis, to ensure that it was not leafless hay that was ground up, and in any case it is doubtful if it has any advantage over Lucerne-hay chaff at an equal price, unless it be for young chickens.

LUCERNE AS ENSILAGE.

Lucerne is usually looked upon as being too good a foodstuff to be converted into ensilage, and in a general way it is contended that poorer fodders are good enough to supply the principal advantage of ensilage, *i.e.*, succulence, whilst those rich in protein should be stored so that this valuable constituent is not wasted. On the other hand, if Lucerne is the only green forage grown, it is usually of advantage to store some of it as ensilage, to supply succulent feed in the heart of winter and other times



STORAGE OF LUCERNE.—Making lucerne ensilage at Wood's Point, South Australia.

of shortage. Although there is some wastage of valuable material, Lucerne makes a first-class ensilage, much relished by livestock, and still rich in protein.

When making ensilage, the forage must be picked up as soon as cut and should not be allowed to lie on the ground for even a short while, and certainly not overnight. As a little extra water does not injure the ensilage, and, as a matter of fact, keeps the cut plants fresh for a longer time, it often pays to cut the crop when wet with dew or rain. It must be carted straight to the silo or stack, and be put into the receptacle or heap without delay. If to be put in a constructed silo the forage should be chaffed, but if to be stored in a rough hole in the ground, or in a stack, the forage as cut with the mower will not be further treated. When the silo is full it should immediately be weighted down with fencing posts,

stones, &c., and about 400lbs. to the square foot of roof surface should be applied. If manufacturing the ensilage in a stack the outside ring should be kept much higher than the middle, whilst building, which prevents the excessive bulging of the sides when the usual extensive settlement takes place. It is absolutely essential with stack ensilage that as soon as the stack is completed the weight should be applied, and for this form a weight of about 500lbs. to 600lbs. per square foot is required. A most suitable article to use to weight down ensilage, and one often obtainable on farms, consists of ordinary rough stones of a size readily handled and thrown by a man. With such material the weighting down can be done quickly and easily, and the weights can be thrown off again without trouble.

Success in ensilage making, particularly if made in a stack, is wrapped up with:—

- (1) Putting the cut fodder into the silo or stack whilst quite fresh;
- (2) filling the receptacle or completing the stack rapidly; and
- (3) weighting it down immediately the last load is put in position.

Lucerne ensilage can be fed to all farm livestock, in the same manner and in about the same quantities as is the green forage, with the exception that great care must be shown to see that no mouldy material is given to horses.

PRODUCTION OF LUCERNE SEED.

The production of good quality Lucerne seed in payable quantities is wholly dependent upon the weather conditions prevailing during the period from the pollination of the first flowers, until the last blooms have dropped. The seed crop might be spoiled by a rain falling when the plants are in bloom and before the flowers are fertilised. The same thing might apply through the intervention of cool weather at this time, by hindering the "tripping" of the flowers, and so reducing the number of flowers that are fertilised, and the occurrence of a frost about flowering time prevents the setting of seed. If very hot, dry weather is experienced during flowering time, in years when the soil is rather lacking in moisture, it leads to a light crop of seed containing many small, ill-developed seeds. So uncertain is the seed crop that growers are never sure that they are to obtain profitable returns until the plants are actually covered with pods carrying seeds. Because of this dependence upon the weather at flowering time, only those localities where these impediments to the setting of seed are comparatively rare happenings, can hope to economically produce good quality seed, and any lucerne-growing district so favored has a great advantage over others for this purpose. The favorable natural conditions obtaining in portions of South Australia have enabled this State to come to the fore in recent years as a producer of first-quality seed, and on the present showing it appears that great progress will be made along these lines in the future. The ideal conditions for the production of high-class seed are to be found where the Lucerne plants make fairly vigorous growth without artificial watering, and where plenty of sunshine and hot, dry weather are experienced in the summer. Where these climatic conditions exist and the water-table is far enough down, good seed can be secured from irrigated Lucerne, when the application of the water is strictly controlled.

Lucerne plants with plenty of room, so that all parts of the plants are exposed to the light and air, are the heaviest seed producers, and so thin stands of fairly vigorous plants give the best results. With thick stands the seed-pods are limited to the tops of the plants, because neither blooming

nor pollination are good on the shaded parts of the plants. Lucerne grown in spaced rows usually gives better crops of seed than when broadcasted in the ordinary manner or grown in rows close together.

As with most other leguminous plants, the flowers of Lucerne are fertilised by the blossoms being "tripped." This "tripping" usually consists in the pollen-carrying parts of the flower (stamens) being moved from their enclosed position alongside of the immature pod and being forced outside of the petals, at the same time releasing a shower of pollen. It is the "tripping" of the flowers that leads to their fertilisation, and so the setting of the seed. This is often brought about by insects alighting upon the flowers, but, fortunately, Lucerne is not wholly dependent upon insects to "trip" the flowers, for in some circumstances sunshine also leads to this



LUCERNE SEED.—Illustration showing a reaper-thresher harvesting and cleaning lucerne seed on the first occasion that this job was carried out in one operation in South Australia. The crop, which returned the very high yield of 420lbs of seed per acre, was grown by Mr. S. E. Mudge, of "Attunga," Hallett, South Australia, and was harvested in March, 1928. The machine used is a reaper-thresher fitted with a modification of the pea-harvesting front-piece.

liberation of pollen, but fertilisation by insects gives better results than self-fertilisation. To ensure the presence of plenty of insects, some seed-growers insist that bees should be kept near Lucerne fields from which seed is to be harvested, although in all probability bees do not play as important a part in this direction as do other types of insects.

Various methods of harvesting the seed are practised, but in a general way they consist either of cutting all the crop and then threshing the seed, or the pods only are collected. If the former method is followed the cutting of the crop is commenced when about two-thirds of the pods have turned a dark brownish-black color, but if only the pods are to be harvested, the seed crop must be more matured. In the seed-producing districts of this State where irrigation is not practised, it is usual to harvest the seed direct, either by doing the whole operation at once with a Reaper-thresher fitted with lucerne harvesting front-piece and special sieves, or by collecting the crop of seed with a stripper, removing and cleaning the seed with a winnower, and repeatedly passing the unthreshed pods through the threshing drum of the stripper, while it is being drawn behind a travelling conveyance which carries the pods to be threshed. If the whole crop is to be cut, small, loose sheaves are made when a binder is used, and they are

stooked until properly dry before any attempt is made to thresh the seed. If cut with a mower, the crop should be handled very carefully with forks and put into rows, and finally into cocks so small that each one can be easily picked up as a single forkful when carting to the thresher. Small areas are cut with a scythe and dried with as little handling as possible. The best time to cut the seed crop is in the morning when the plants have dew upon them, because the pods are then tough and there is less danger of the shattering of the seed. The crop from small areas is often threshed by flail and cleaned by the wind and hand sieved, but larger lots are threshed and cleaned in ordinary power threshers adjusted with special sieves, or in clover-hullers made specially for the threshing, cleaning, and dressing of small seeds.

Success with the seed crop on irrigated areas is wholly dependent on having full control of the water supply, and in using the minimum amount that will keep the plants making slow, healthy growth. Rapid, luxuriant growth is required for hay crops, but such plants set little seed. If the previous cut of forage had been heavily watered there is often no need to irrigate the seed crop at all, but if a watering is necessary, the best time to apply it is after the seed has set, and the flowers have fallen.

Very rarely is the first crop of Lucerne ever left as a seed crop, because it is usually too rank, and the season of the year is too cool and damp to expect a good crop. Sometimes the second crop is allowed to mature seed, but more often best returns as to quantity and quality are secured from the third crop, which ripens its seed in this country, when the weather is usually dry and hot at about the end of February or in early March. When growers intend to leave the second crop for seed they usually carefully examine the plants immediately after flowering is completed, and if there is not a plentiful setting of seed, the crop is cut for hay, and the next growth is then left as a seed crop.

The amount of seed harvested varies a good deal according to the season, but at least 150lbs. per acre should be secured, and it may occasionally be increased above this quantity to as high as 500lbs. per acre.

The production of a full seed crop often shortens the life of some otherwise long-lived plants, but this does not appear to be so with Lucerne, and the stands last just as long whether all the growth is made into forage or a seed crop be taken every year.

DISEASES AND PESTS OF LUCERNE CROPS.

Fortunately, there are no diseases which do noticeable damage to Lucerne crops in South Australia, but there are a few pests which sometimes make their presence felt. Of these, the only ones of economic importance are Lucerne Flea, Boll Worm, and Dodder.

THE LUCERNE FLEA OR CLOVER SPRINGTAIL

(*Smynturus viridis*).

The Lucerne Flea lives and reproduces itself during the cooler and moister parts of the year, and in this State is active from the first winter rains in April or early May until the warm weather arrives in October. The insects are very active during that period and feed on a big assortment of garden and field plants, and are particularly fond of Clovers and Medics. They play havoc with the leaves of Lucerne crops left for winter feed, and with the first growth made in the spring, but no damage whatever to

the principal growths during the summer, and there is no evidence to show that the annual attack shortens the life of the stands.

The insects are small, soft, and wingless, being of a dumpy shape about one-twelfth of an inch long and almost as thick, and are of a greenish-yellow color, but vary a good deal in this regard between green, yellow, and even orange. They are able to jump a few inches by means of a forked, spring-like apparatus on the abdomen. In favorable seasons they become so plentiful that they arise before a person walking through affected crops, like a thin cloud of ashes. Their presence is noticed by the fact that the plants lose their general green color and take on an ashy-grey appearance due to the fact that the "green" of the leaflets is eaten right out. They eat the lower surface of the leaves, usually taking most of the green matter without

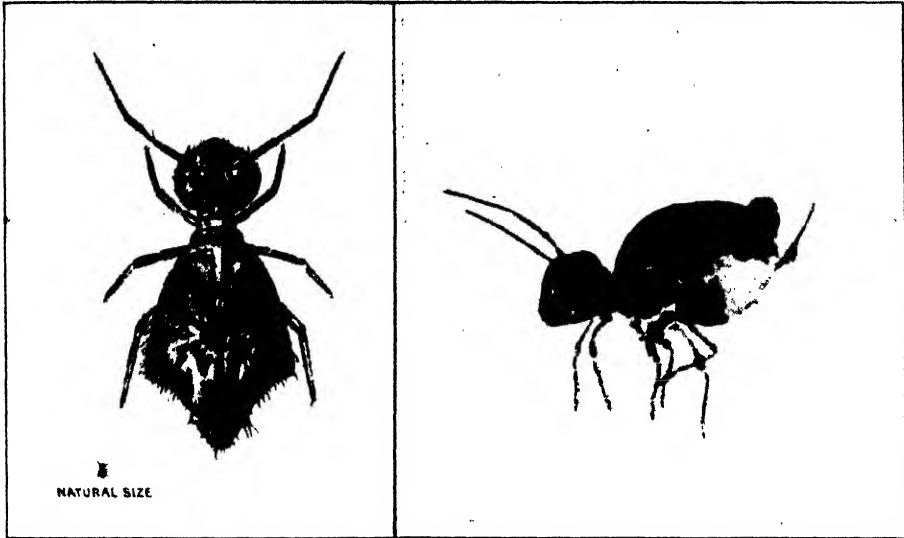


Photo by Dr. J. Davidson.

LUCERNE FLEA.—Showing upper-side and side view of *Smynturus viridis* greatly enlarged.

going right through the leaf, leaving them like skeletons, and of a greyish color. The females lay on the surface of the ground two or more batches of eggs in a season, of about 50 to 60 eggs to a batch, which in regular, cool, damp weather may hatch out in 10 to 12 days, but when the hot weather arrives the eggs remain dormant throughout the Summer, and hatch out when the autumn rains arrive.

When they are noticed in a Lucerne crop it should immediately be cut, or fed down rapidly, and if it is desired to keep the next growth free from the insects, the land should be sprayed with about 80galls. per acre of a mixture of 10lbs. arsenate of lead, 2 quarts of nicotine sulphate, and 500galls. of water. The Lucerne should not have stock put on it for at least three weeks after spraying, otherwise severe scouring of the animals might result.

THE BOLL WORM (*Heliothis obsoleta*).

Caterpillars of the Boll Worm are to be found every year in Lucerne, but they only occasionally do much damage. Sometimes they are in sufficient numbers to reduce the yield of forage, and they also lower the value of what is left, because they feed on the young succulent growth in

preference to the older leaves. The flowers of seed crops or even the seed-pods are attacked at times by these caterpillars, with rather disastrous results, because they leave very little seed when present in large numbers, and the crop by that time has passed the stage when good hay could have been made of it.



LUCERNE FLEA.—Spraying an affected crop after being grazed down by livestock.

These caterpillars attack practically all of the well-known cultivated crops. They are very widespread, and most countries or districts have local names for the pest. When full-grown they are about 1½ ins. in length, and of a color varying between pale, yellowish-green to dark green, but are always striped along sides and back, the stripes varying from yellow, to green, to black in color. The larvae usually feed from three to five weeks, after which they enter the soil to a depth of about 4 ins. to pupate. In the summer the pupae stay below-ground from two to four weeks, but those of the last brood may remain in the soil for six months.

When forage crops of Lucerne are attacked they should immediately be grazed, or cut and grazed, and if the infestation is very bad the butts of the plants should be thoroughly sprayed with one of the well-known arsenical sprays. Spraying for attacks on seed crops is not likely to be very successful, and the Entomologist at the Waite Research Institute (Dr. J. Davidson) thinks that more good can be done by growers of Lucerne seed, by very thoroughly cultivating the land in the winter when the pupae are in the ground, and so considerably reduce the numbers in the first brood. When the first brood is noticed the crop should be heavily stacked, after which few will be left to produce another brood to damage the seed crop.

DODDER (*Cuscuta trifoliū*).

In some portions of the world a series of leafless parasitic plants, known as Didders, are very plentiful, and do much damage to a number of the cultivated crops. Of these, the Clover Dodder is one of the worst, and is one of the most pernicious pests with which Clovers and Lucerne have to contend. This parasite has long wire-like leafless stems of an orange to reddish color, which attach themselves to the stems of the host plants by

small suckers, and through these attachments draw all of their sustenance. The seeds, which are of a yellowish-brown color and very small (about one-twenty-fifth of an inch in diameter), germinate in the soil, and the resulting thread-like growth entwines itself around a host plant, produces a few suckers, and then the bottom of the stem dies and withers away, leaving the



CLOVER DODDER.—Showing how *Cuscuta trifolii* entwines itself about the attacked plants and eventually kills them. Dodder in full flower.

Dodder plant quite separated from the soil. The plants grow very rapidly, entwining themselves all over the host plant, then extend to neighboring plants, and soon cover fairly considerable patches of crop. The flowers, which are plentiful along the stems, and of a creamy to almost golden color, produce a lot of seeds, which fall to the ground and increase the infestation. Tiny little fragments of stems will grow if they reach the soil, and this is another serious means of spreading the trouble.

As the main source of infection comes from seed, great care should be taken to make quite certain that Lucerne seed containing Dodder is not sown. The seed is readily recognisable, and being so much smaller than the Lucerne seed can easily be removed by sieving. If Dodder appears in a crop the affected plants should be carefully cut right down to the crowns and be burnt on the spot where they grew, or if to be carted off, should be placed in bags or some such receptacle, making sure that no small pieces are dropped on to unaffected parts of the crop. Affected crops

should not be grazed by livestock, because the seeds pass through the animals unaltered and may spread the parasite. Dodder can be killed by sprays, and one of the best for the purpose is a solution of Sulphate of Iron in water, of a strength of 10 to 15 per cent. This will burn the growth of the Lucerne, but the plants will all shoot again without loss of vigor.

SUMMARY.

1. Lucerne flourishes in semi-arid climates, and although it requires much water for maximum development, it grows well wherever cereals are profitably grown in such climatic conditions. It is an important crop in South Australia now, still, on the experience of other countries with similar climate, it will become of more consequence to us in the future.

2. Lucerne has been domesticated for many centuries, and as a consequence is well known in most agricultural countries of the world. It was introduced into Australia shortly after the first settlement by white man, and has made steady progress since that time.

3. True Lucerne (*Medicago sativa*) is a fairly erect perennial leguminous plant, the stems of which originate from a crown at the summit of the taproot, situated at the surface of the ground. The leaves consist of three more or less wedge-shaped leaflets; the flowers are always violet; and the seedpods are spirally twisted in two to four loose coils, open through the centre.

4. There are numerous varieties of Lucerne, but they are often grouped together and given locality names. Those of importance to South Australia are Australian, Common American, Hairy Peruvian, Smooth Peruvian, and Arabian.

5. In suitable climates Lucerne can be grown in all types of soil between light sands and heavy clays, but it does best in rich, deep, well-drained soils containing plenty of lime.

6. The most favorable climates for Lucerne growing are the semi-arid and the sub-tropical. Very heavy yields are secured in most places where the winters are mild. The climate of all parts of South Australia is suitable for Lucerne.

7. When maximum growth is being made, Lucerne requires a plentiful supply of water, either under irrigation, from a close watertable, or from rain. On the other hand, it can make a wonderful bulk of growth on a comparatively small amount of water.

8. To ensure a good stand, only the very best seed should be used.

9. It is so important that a good stand be established during the year of seeding the land to Lucerne, that very thorough preparation is well warranted.

10. The ideal seedbed for Lucerne consists of fine soil, almost free of clods, about 1½ in. in depth, resting on very compact under-layers. On light soils liable to drift, a cereal crop should be grown on the land the year previous to establishing the Lucerne, and the seed be drilled into the stubble.

11. Drilling the seed into the land is the best method of seeding, provided it is not put in to too great a depth.

12. In most conditions in this State it is better to seed the Lucerne in the autumn rather than in the spring.

13. For long-time stands under irrigation, 20lbs. of seed per acre should be used, but if not to be irrigated, 10lbs. to 15lbs. are sufficient. On sandy

land over a fairly close watertable, from 9lbs. to 12lbs. are sufficient. On ordinary wheat lands from 6lbs. to 8lbs. are enough; and on sandy wheat lands of the mallee, from 4lbs. to 6lbs. are ample.

14. "Nurse" crops are never required for Lucerne in this country unless being seeded on bare, sandy land liable to drift, and then about 15lbs. of barley or 20lbs. of wheat are an ample seeding.

15. Fortunately it has not yet been found necessary to inoculate the land for our Lucerne crops, but when some sour soils are being seeded to the crop we may have to do so.

16. Unless farmyard manure is well rotted it should not be applied to the land at seeding time. Depending on the conditions, from $\frac{1}{2}$ cwt. to 2cwt. superphosphate per acre is the only fertiliser required at this time.

17. If the soil is deficient in lime, a dressing of about 2 tons per acre should be applied before seeding to Lucerne.

18. Autumn-sown Lucerne needs no after-seeding treatment except to cut weeds once in the spring, whereas when spring-sown it may be necessary to cut the weeds two or three times.

19. When Lucerne is grown on heavy-textured land, the soil should be cultivated very thoroughly at least once each year. Light-textured lucerne land does not need the same cultivation, but plenty of harrowing does much good.

20. All forms of farmyard manure stimulate Lucerne crops, and an annual application of superphosphate should be applied at cultivating time.

21. Lucerne is almost an ideal crop for cutting and carting to livestock, and is also suitable for grazing. The life of the stand is considerably shortened, and each growth during the year is retarded by grazing instead of cutting.

22. If a first-year stand of Lucerne is thin, the weak patches should be reseeded while the plants are young, otherwise it is almost impossible to thicken-up the stand.

23. To re-establish a stand, the land should be very thoroughly ploughed, and two non-leguminous crops be grown on it before reseeding to Lucerne.

24. Lucerne reaches its maximum development when grown in semi-arid climates with irrigation.

25. When plenty of water is available, flooding is the most economical method of irrigating Lucerne. If the supply of water is rather limited, it should be run in between rows of plants. When only a small amount of water can be used, or when the difficulties of grading are considerable, the water should be applied from overhead sprinklers.

26. More or less expensive soil levelling is usually necessary before establishing Lucerne that is to be irrigated, and as the grades and levels are expected to last for many years, the job must be carried out properly.

27. Before seeding to Lucerne in irrigated areas the land should be thoroughly watered, and the seed should be put in while there is still enough moisture in the soil to ensure a full germination.

28. The amount of water available controls the details of water application. If maximum results for available water are being sought the water must be made to cover as large an area as possible.

29. To get maximum returns from Lucerne, water should be applied as soon and as often as the plants show that they need it. In the early part of the season one watering for each cutting is sufficient, but later on when temperatures increase one watering before and one after each cutting will be required in all porous soils.

30. Irrigations should be given as soon after cutting as possible, because the job is easier to carry out at that time.

31. When plenty of water is available the irrigating should be by flooding; on sandy lands and those liable to wash, where the flow of water is rather small, and where the slope of the land is more or less steep, the watering should be done by overhead sprinkling; furrow irrigation should be practised on soils which set very hard when dry, where there is rather a small head of water, where the land slopes a little too much for check-banks, and where soils are liable to "wash."

32. Lucerne produces very heavy crops of fine-textured forage, extremely rich in protein, lime, and minerals, suitable for and relished by all farm livestock, but particularly fitted for the production of milk and eggs, and for young growing animals.

33. Lucerne is the best plant yet introduced into this State for the production of green forage, which can either be grazed off by livestock or be cut and carted to the animals.

34. When about to be grazed by cattle or sheep, the animals should be gradually accustomed to the pasture, and should not be allowed on it when the crop is wet with dew or rain. Pigs make better use of grain, when grazed on Lucerne, and the mixture produces the best quality pork.

35. For maximum returns all heavy luxuriant stands of Lucerne should be cut and carted to the livestock. Under this method of handling the stands last for longer periods than if grazed.

36. The Lucerne crop should be cut for hay when the fresh shoots have started from the crowns, which is usually at the time when about one-tenth of the flowers have bloomed.

37. The leaves of the plant have much higher feeding value than the stems, so great care must be shown when making hay to save all the leaves.

38. Cutting the crop for hay in an early stage each time leads to the production of more forage, but shortens the life of the stand.

39. The crop should not be cut for hay while wet with dew or rain. If cut in the morning it should be in windrows or cocks by night. If cut in the late afternoon it should be in rows or cocks before cutting time next day.

40. After cutting, the forage should only be left in the swath long enough to wilt, then it should be put in windrows, and when it has toughened it should be put in small cocks. As soon as it has dried to the extent that moisture cannot be squeezed from it when a handful is tightly twisted, it should be stacked.

41. If Lucerne hay is grown for sale, or if it has to be carted long distances, it is often an economical way to handle it to press it into bales in the field where grown.

42. Cattle and sheep can be fed wholly on Lucerne hay, but with horses, pigs, and poultry it should only form portion of the ration.

43. Lucerne makes extremely good ensilage, but it is usually stored in this manner only when it is the principal forage grown, and when succulent feed is required in the winter.

44. Success in ensilage-making depends on putting the cut fodder into the silo or stack whilst quite fresh, filling the receptacle or completing the stack really quickly, and weighting it down immediately the last load is put in position.

45. The ideal conditions for the production of high-class Lucerne seed are to be found where the plants make fairly vigorous growth without

artificial watering, and plenty of sunshine and hot dry weather are experienced in the summer.

46. Thin stands of Lucerne, with the plants having all parts exposed to light and air, are the best seed producers.

47. Lucerne seed can be harvested with—(1) reaper-thresher with special mouthpiece and sieves; (2) stripper and winnower, and continually passing the unthreshed pods into the drum of the travelling stripper; (3) cutting with binder or mower, drying and threshing; (4) cutting with scythe, drying, threshing with flail, winnowing with wind, and cleaning with hand sieves.

48. There are only three pests of Lucerne of economic importance in South Australia, namely, Lucerne Flea, Boll Worm, and Dodder.

49. The Lucerne Flea does damage to Lucerne left standing for the winter, and the first growth in the early spring. Affected crops should immediately be cut or fed down rapidly, and if it is desired to keep the next growth free from the insects the stand should be sprayed with about 80galls. per acre of a mixture of 10lbs. arsenate of lead, 2qts. of nicotine sulphate, and 500galls. water.

50. The Boll Worm does damage to Lucerne crops when it attacks the seed crop. The best method of control is to thoroughly cultivate the land in winter and when the first brood appears the crop should be heavily stocked.

51. Clover Dodder is a parasitic plant which smothers Lucerne plants. Care should be taken to see that Lucerne seed is free from Dodder seed. If patches of a crop are attacked they should be sprayed with a 10 to 15 per cent. solution of sulphate of iron in water.

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ORCHARD NOTES FOR SOUTHERN DISTRICTS, MAY, 1931.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

Rain is again late in starting and it is difficult to get in cover crops. Cover crops need an early start if they are to be beneficial, because they must be ploughed in whilst the soil is moist. Every endeavor must be made to prevent washaways; a dry surface causes rain to collect and run towards the lower parts of the orchard, so that much of the water is lost as well as some of the soil. Planting young trees should be done this month. May has been proved to be the best month for transplanting deciduous trees, but it is necessary that the soil be in good condition for the work. Holes will have been ready for some time with centre stakes in position, so that no time will be lost when the trees are lifted from the nursery. Do not plant in the rain or if soil is very wet; it must be friable for good work.

Get on with the pruning. Finish up peaches, nectarines, and apricots first. Vines can be cleared up early and allow of cultivation at earliest possible moment; do not make big cuts if possible to avoid them. Trees in bearing need but little pruning. New men should ask the Instructor to demonstrate.

New plantings, especially citrus, must be supplied with water to keep them going until rain falls, and the soil about young trees must be kept loose. Frost does less damage if the soil is moist and worked. Keep limbs of citrus up from the ground so as to lessen the attack of "brown rot."

Fruit in store needs examination at intervals.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on April 29th, there being present Messrs. F. Coleman (Chair), H. N. Wicks (Vice-Chairman), S. Shepherd, A. M. Dawkins, P. H. Jones, A. J. Cooke, P. J. Baily, Dr. A. E. V. Richardson (Director Waite Agricultural Research Institute), W. R. Birks (Principal Roseworthy Agricultural College), and H. C. Pritchard (General Secretary).

Apologies were received from Messrs. H. S. Taylor, A. L. McEwin, and Professor A. J. Perkins.

Charges for Handling Wool.—The Conference of Yorke Peninsula Branches resolved—“That this Conference protests against the high charges for handling wool at Port Adelaide by wool brokers.” The Board gave careful consideration to this matter, when it was agreed that the prices at present charged by brokers were not unreasonable.

Agricultural Statistics.—The Yorke Peninsula Conference also resolved—“That this Conference suggests that in view of the difficulty which the farmer has in obtaining authentic information regarding the world's production of his products, we suggest that the Agricultural Bureau establishes, in conjunction with other countries if possible, an international bulletin to be published every three months.” To give effect to this resolution would mean the establishment of a sub-department, and the Board was not prepared to recommend action on these lines. Discussing the resolution, Dr. Richardson said that reliable information was published in the commercial columns of the daily paper, and once each month a statement appeared giving details of the world's position of wheat. He further suggested that reports should be obtained from the Liverpool wheat markets, from which extracts could be made and published in the *Journal*. Referring to overseas prices for dairy produce, Mr. Cooke mentioned that the Secretary might communicate with the Federal Department of Markets and Migration, from whom details of prices could be obtained.

Leave of Absence.—Mr. R. H. Martin intimated that he proposed making a business trip to Great Britain, and applied for leave of absence until June 30th, 1931. The Secretary was instructed to bring this matter under the notice of the Minister, recommending approval.

Winter School for Farmers.—Mr. Birks informed the Board that the Roseworthy College would not hold a Winter School for Farmers this year.

Life Member.—The name of Mr. F. Rowley, of the Lenswood and Forest Range Branch, was added to the roll of life members of the Agricultural Bureau.

Other business was considered by the Board in committee.

New Members.—The following names were added to the rolls of existing Branches:—Mount Gambier—R. J. Cleve; Ashbourne—G. Kirkham, W. J. D. Whittam, W. Carter, A. Carter, O. Watson, K. M. Horwood, W. Clarke, R. Bailey, C. J. Pitt, G. Allingame, T. C. Allingame; Wasleys—J. H. Course; Port Elliot—A. E. Hawke; Collie—A. E. Leopold; Parilla—R. M. Neindorf; Wasleys—K. Mitchell; Waddikee Rocks—E. J. Joyce, H. A. Joyce, R. W. Wilsdon; Goode Women's—Mrs. H. Smith; Hartley—L. Jaensch; Miltalie—E. J. Ramsey; Pygery—A. Riggall; Boors Plains—M. Longmire; Rendelsham—A. Adamson; Murray Bridge—W. D. Netherwood; Kalangadoo—H. Morris; Milang—Alex. Moar, B. Casley; Parrakie Women's—Miss Lorna Hagel; Belalie Women's—Miss P. Moore; Ashbourne—F. Allingame, R. D. Meyer, O. C. Kirkham, G. D. Whittam, J. Watson, H. H. Pitt; Palabie—Leslie Mayhew; Wandearah—N. R. Ferme, R. Kimberley; Everard East—Keith Wilkin; Nantawarra—Murray Dixon, Victor Herbert, Ray Forrest.

Number of new members, 45; number of members, 8,462; number of Branches, 305.

DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported on May 1st, 1931:—

BUTTER.—The production of butter throughout South Australia steadily declined during April, but this is usual, and the importation of quantities from the Eastern States was necessary to augment supplies. The position now is, however, that there is almost sufficient cream and butter arriving for all local needs, as the purchasing power of the public generally has so much decreased. Values showed slight fluctuation during the month, and at date are as follows:—Choiceest creamery fresh butter, in bulk, 1s. 5½d.; prints and delivery extra; second and third grades, 1s. 3½d. (these prices are subject to the stabilization levies); best separators, 1s. 3d. to 1s. 4d.; well-conditioned store and collectors, 1s. to 1s. 1d.

EGGS.—These also show a seasonal decline, and each week there was a noticeable shrinkage. Supplies of cold stored are being drawn on by many holders, so that this is resulting in all demands being met. Values have firmed, and at present are:—Ordinary country eggs, fresh hen 1s. per dozen, duck 1s. 1d. per dozen; selected, tested, and infertile higher.

CHEESE.—The production with the South-Eastern factories steadily declined, but there was sufficient coming forward each week for local requirements and a small surplus was shipped to Western Australia from time to time. Values are steady. New makes, large to loaf, 7½d. to 8½d. per lb.; semi-matured and matured, 10d. to 11d. per lb.

ALMONDS.—Very heavy supplies were marketed by growers in various parts of the State, and for the time being there was a very poor demand. Towards the latter end, however, local buyers operated freely, and also some shipments were made to the Eastern States, so that stocks were considerably reduced. There has been a better call for kernels and prices are firm. Brandis, 6d. to 6½d.; mixed softshells, 5d. to 5½d.; hardshells, 3d. to 3½d.; kernels, 1s. 4½d. to 1s. 5d. per lb.

HONEY.—This commodity, which is essentially a winter food, met with better request, but with the heavy carry-over of stocks from the previous year, there were ample supplies for all needs, and rates were unchanged. Prime clear extracted in liquid condition, 3½d. to 3¾d.; best quality candied lots, 2½d. to 3½d. per lb.; second grade, 1½d. to 2d. per lb.

BEESEWAX.—In good supply; demand steady. Rates nominally 1s. 3d. to 1s. 4d. per lb. according to sample.

BACON.—The demand for bacon has shown a marked improvement, which is usual with the incoming of winter conditions, and with values at so reasonable a level, the public are purchasing proportionately more extensively than usual. Best local sides, 9d. to 9½d.; best local factory cured middles, 9d. to 9½d.; large, 8½d.; local rolls, 7d. to 7½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 1d.; local hams, 11d. to 1s.; cooked, 1s. 2d. "Sugar Cane" brand lard in packets, 11d.; in bulk, 10d. per lb.; local prints, 10d. per lb.

LIVE POULTRY.—Throughout the month extensive quantities of all classes of live poultry were marketed and cleared. Poulterers and produce dealers this year, however, are not carrying any stocks in cold store, and are buying hand to mouth supplies as required. The demand has been regularly maintained, and values, generally speaking, are satisfactory considering the times. We held one or two special sales of pure-bred stock, when good catalogues were submitted and readily cleared to a large attendance of buyers. We advise consigning. Crates loaned on application. Prime roosters, 3s. 8d. to 5s.; nice-conditioned cockerels, 3s. to 3s. 7d.; fair-conditioned cockerels, 2s. 3d. to 2s. 9d.; chickens lower. Heavy-weight hens, 3s. 3d. to 4s. 6d.; medium hens, 2s. 4d. to 3s.; light hens, 1s. 9d. to 2s. 3d.; couple of pens of weedy sorts lower. Geese, 4s. to 5s. Prime young Muscovy drakes, 3s. 6d. to 4s. 9d.; Muscovy ducks, 2s. 6d. to 3s. 4d. Ordinary ducks, 1s. 8d. to 2s. 3d.; ducklings lower. Turkeys, good to prime condition, 8½d. to 10d. per lb. live weight; ditto, fair condition, 7d. to 8d. per lb. live weight; fattening sorts lower. Pigeons, 3½d. to 4½d. each.

POTATOES.—Local, 5s. to 5s. 6d. per cwt.

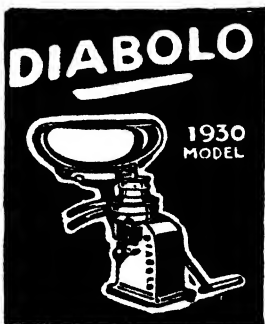
ONIONS.—Brown, 5s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., FEBRUARY AND MARCH, 1931.

IMPORTS.

Interstate.

	February.	March.
Apples (bushels)	30	355
Bananas (bushels)	7,054	5,351
Citrus—		
Lemons (bushels)	180	58
Oranges (bushels)	15	8
Grapes (bushel)	1	1
Passion fruit (bushels)	3	162
Peaches (bushels)	9	4,140
Pears (bushels)	5	—
Pineapples (bushels)	567	514
Tomatoes (bushels)	56	125
Peanuts (bags)	61	72
Peanuts, kernels (bags)	10	14
Cabbages (bags)	—	2
Melons (bag)	1	—
Onions (bags)	542	1,381
Peas (bags)	2	4
Potatoes (bags)	—	196
Swedes (bags)	45	—
Bulbs (packages)	48	69
Plants (packages)	20	4
Seeds (packages)	79	63
Wine casks (number)	2,139	1,836



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IMPORTS AND EXPORTS OF FRUITS, &c.—*continued.**Fumigated—*

Citrus—Lemons (bushels)	120	40
Wine casks (number)	22	—

Rejected—

Bananas (bushels)	30	24
Citrus—		
Lemons (bushel)	1	—
Oranges (bushels)	—	1
*Grapes (bushel)	1	1
Peaches (bushels)	—	93
Pineapples (bushels)	9	—
Second-hand bags (number)	—	73
Second-hand cases (number)	1	1

Overseas.

(State Law.)

Wine casks (number)	308	513
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*Prohibited import.

Federal Quarantine Act.

	February.		March.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	1,391	143,431	6,061	1,087,643
Bamboos	—	—	2	—
Canes	17	—	—	—
		No.		
Plants	1	1,115	—	—
Rattans	89	—	—	—
	Tons.			
Sand	350	—	—	—
Seagrass	46	—	—	—
Tea chests	2	—	—	—
Woodwool	—	—	100	11,200
		Sup. ft.		Sup. ft.
Timber	32,788	1,842,651	28,090	124,622

EXPORTS.

Federal Commerce Act.

	February.	March.
	Packages.	Packages.
England—		
Apples	—	10,863
Pears	1,246	345
Plums	50	—
Grapes	4	30
Peaches	1	—
Mixed fruit	—	20
Scotland—Apples	—	1,974
Germany—		
Apples	—	5,467
Mixed fruit	—	11
Denmark—Apples	—	160
India—		
Apples	293	784
Pears	330	—
Grapes	480	2,020
New Zealand—		
Bulbs	4	—
Grapes	—	365
Seeds	—	10

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month and to the end of April, 1931, also the average precipitation to the end of April and the average annual rainfall.

Station.	For April 1931.	To end April.	Av'ge to end April.	Av'ge Annual Rain-fall.	Station.	For April 1931.	To end April.	Av'ge to end April.	Av'ge Annual Rain-fall.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta	0.57	0.90	1.86	4.72	Brinkworth	1.37	2.86	2.76	15.85
Marree	1.31	2.37	1.82	5.86	Blyth	1.53	3.45	3.32	16.86
Farina	2.85	3.60	2.14	6.46	Clare	2.56	4.76	4.61	24.61
Copley	2.82	3.37	2.37	7.93	Mintaro	2.17	4.21	3.75	23.43
Beltana	2.11	2.94	2.61	8.59	Watervale	2.00	4.93	4.99	27.10
Blinman	2.13	3.23	3.29	12.02	Auburn	1.91	3.94	4.70	24.08
Hookina	2.73	4.72	2.23	11.51	Hoyleton	1.43	2.83	3.52	17.44
Hawker	5.73	7.10	2.57	12.28	Balaklava	0.77	2.12	3.35	15.61
Wilson	4.21	5.52	2.58	11.84	Port Wakefield ..	0.75	2.23	3.24	13.04
Gordon	2.76	4.16	2.62	10.73	Terowie	1.37	2.30	3.04	13.47
Quorn	2.21	3.39	2.71	13.42	Yarcowie	0.96	1.92	3.13	13.72
Port Augusta	2.12	3.75	2.48	9.43	Hallett	1.21	2.40	3.16	16.47
Bruce	1.92	3.24	2.18	9.94	Mount Bryan ..	1.05	1.99	2.95	16.79
Hammond	1.70	3.15	2.73	11.41	Koorunga	1.34	2.75	3.53	17.96
Wilmington	2.44	3.75	3.51	17.63	Farrell's Flat ..	1.85	3.23	3.52	18.75
Willowie	2.33	3.35	2.54	12.11	WEST OF MURRAY RANGE.				
Melrose	1.90	3.55	4.65	23.01	Manoora	1.81	3.06	3.33	18.94
Booloroo Centre...	1.67	2.72	3.14	15.26	Saddleworth	1.72	3.19	3.99	19.60
Port Germein	1.30	2.47	2.87	12.47	Marrabel	1.73	3.21	3.74	19.87
Wirrabara	1.00	1.96	3.66	19.34	Riverton	2.24	3.66	4.10	20.81
Appila	1.04	1.87	3.35	14.69	Tarlee	1.47	2.99	3.65	18.13
Cradock	3.00	4.26	2.51	10.87	Stockport	1.19	3.08	3.40	16.81
Carrieton	1.89	2.98	2.70	12.40	Hamley Bridge ..	0.82	2.40	3.52	16.60
Johnburg	1.86	2.81	2.33	10.64	Kapunda	1.26	2.75	4.07	19.85
Eurelia	1.79	2.86	2.89	13.06	Freeling	1.03	2.61	3.59	17.95
Orroroo	1.70	2.59	3.18	13.28	Greenock	1.13	3.01	4.04	21.68
Nackara	2.06	2.67	2.93	11.16	Truro	1.69	2.82	3.83	20.09
Black Rock	1.85	2.49	2.89	12.50	Stockwell	1.34	2.61	3.83	20.18
Oodlawirra	2.07	2.98	—	—	Nuriootpa	1.91	3.60	3.86	20.65
Peterborough	1.48	2.55	3.08	13.30	Angaston	1.98	3.55	4.13	22.49
Yongala	1.64	2.78	3.02	14.46	Tanunda	1.15	2.68	4.24	22.12
NORTH-EAST.					Lyndoch	0.97	2.52	3.98	23.58
Yunta	2.97	4.00	2.32	8.46	Williamstown....	1.34	3.14	4.64	27.71
Waukaringa	2.74	3.59	2.11	8.06	ADELAIDE PLAINS.				
Mannahill	2.15	2.59	2.44	8.31	Owen	1.15	2.72	2.66	13.91
Cockburn	4.02	4.94	2.25	7.93	Mallala	0.72	2.08	3.43	16.67
Broken Hill, N.S.W.	4.48	5.76	2.84	9.61	Roseworthy	1.25	2.75	3.48	17.38
LOWER NORTH.					Gawler	0.94	2.47	3.90	19.06
Port Pirie	1.17	2.42	3.05	13.25	Two Wells	0.72	2.33	3.30	15.81
Port Broughton ..	1.56	2.42	2.91	14.02	Virginia	0.64	2.45	3.48	17.23
Bute	1.02	1.67	2.97	15.48	Smithfield	1.35	3.17	3.21	17.51
Laura	1.16	2.17	3.61	18.11	Salisbury	0.63	2.18	3.81	18.60
Caltowie	0.92	1.88	3.44	16.85	Adelaide	0.90	3.16	4.16	21.12
Jamestown	1.14	2.02	3.42	17.84	Glen Osmond ..	0.93	3.42	4.62	26.06
Gladstone	1.25	2.15	3.29	16.40	Magill	1.04	3.37	4.69	25.61
Crystal Brook	1.39	2.40	3.17	15.87	MOUNT LOFTY RANGES.				
Georgetown	1.35	2.45	3.68	18.47	Teatree Gully... ..	0.95	3.19	4.80	27.53
Narridy	1.32	2.12	3.22	15.93	Stirling West ..	1.88	7.08	8.02	46.90
Redhill	1.08	2.11	3.21	16.63	Uraidla	1.95	5.62	7.38	44.11
Spalding	1.25	2.29	3.15	19.34	Clarendon	1.72	4.63	6.14	32.91
Gulnare	1.58	2.97	3.08	18.74	Morphet Vale ..	1.48	3.68	4.39	22.69
Yacka	1.29	2.45	3.03	15.35	Noarlunga	1.25	2.91	3.93	20.40
Koolunga	1.09	2.43	3.05	15.52	Willunga	1.72	3.64	4.72	26.02
Snowtown	1.73	2.71	3.07	15.70	Aldinga	1.52	3.00	3.78	20.25

RAINFALL—continued.

Station.	For April 1931.	To end April.	Average to end April.	Average Annual Rain-fall.	Station.	For April 1931.	To end April.	Average to end April.	Average Annual Rain-fall.
MOUNT LOFTY RANGES—contd.					WEST OF SPENCER'S GULF—contd.				
Myponga	1.62	3.74	4.37	29.14	Rudall	0.54	1.83	2.31	*12.07
Normanville	1.30	2.73	3.78	20.73	Cleve	0.73	3.25	3.02	14.61
Yankalilla	1.31	2.77	4.17	22.95	Cowell	0.48	1.55	2.98	11.16
Mount Pleasant ..	1.51	3.64	4.67	27.29	Miltalie	0.90	3.27	3.23	13.59
Birdwood	1.25	3.12	4.80	29.28	Darke's Peak ..	1.18	2.71	2.45	14.98
Gumeracha	1.79	4.39	5.59	33.45	Kimba	1.37	2.15	2.39	*11.50
Millbrook Reservoir	1.59	4.15	4.66	35.55					
Tweedvale	1.70	4.18	5.61	35.96	YORKE PENINSULA.				
Woodside	1.59	3.92	5.16	32.38	Walleroo	0.92	2.20	3.06	13.04
Ambleside	1.46	4.21	5.72	35.02	Kadina	0.78	1.90	3.29	15.71
Nairne	1.43	4.06	5.12	28.22	Moonta	0.88	1.94	3.32	15.10
Mount Barker	1.92	5.17	5.51	31.71	Paskeville	0.56	1.53	2.92	15.64
Echunga	1.62	4.07	5.87	33.29	Maitland	0.60	2.23	3.80	19.97
Macclesfield	1.42	4.93	5.44	30.62	Ardrossan	0.75	1.89	2.84	14.00
Meadows	1.45	4.19	6.41	36.34	Port Victoria ..	0.84	2.07	2.93	15.44
Strathalbyn	0.95	3.12	3.85	19.43	Curramulka	0.51	2.27	3.24	17.92
MURRAY FLATS AND VALLEY.					Minlaton	1.15	2.37	3.20	17.90
Meningie	1.00	2.31	3.59	18.46	Port Vincent ...	0.43	1.57	2.53	14.56
Milang	1.24	2.51	3.21	15.05	Brentwood	1.11	2.19	2.71	15.52
Langhorne's Creek	1.13	2.70	3.09	14.80	Stansbury	1.00	2.34	3.09	16.89
Wellington	1.15	3.33	3.34	14.64	Warooka	1.36	2.19	2.95	17.60
Tailem Bend	1.17	4.41	2.92	14.66	Yorketown	1.34	2.62	3.00	16.98
Murray Bridge	0.69	2.31	3.18	13.76	Edithburgh	0.97	2.33	3.19	16.44
Callington	0.83	2.37	3.18	15.31					
Mannum	1.40	2.75	2.83	11.53	SOUTH AND SOUTH-EAST.				
Palmer	0.72	1.98	2.84	15.55	Cape Borda	0.79	2.40	3.94	24.76
Sedan	1.05	1.86	2.69	12.16	Kingscote	1.51	2.67	3.21	19.05
Swan Reach	2.08	2.65	2.36	10.65	Penneshaw	2.13	5.27	2.99	18.65
Blanchetown	1.60	2.36	3.06	11.14	Victor Harbor ..	1.31	3.34	4.02	21.33
Eudunda	2.57	3.72	3.44	17.13	Port Elliot	0.92	2.42	3.94	20.02
Sutherland	2.02	2.76	2.09	10.79	Goolwa	0.80	2.08	3.67	17.87
Morgan	0.73	1.38	2.23	9.17	Copeville	1.30	2.68	2.23	11.58
Waikerie	1.07	1.76	2.41	9.61	Meribah	0.97	1.67	2.82	*11.34
Overland Corner ..	0.73	1.33	2.75	10.50	Alawoona	1.08	2.00	2.03	*9.98
Loxton	1.80	2.82	2.81	11.60	Mindarie	1.52	2.26	2.01	11.88
Renmark	0.90	1.68	2.59	10.52	Sandalwood	1.20	2.57	2.40	13.67
WEST OF SPENCER'S GULF.					Karoonda	1.20	3.25	2.47	14.37
Eucla	0.18	2.60	3.18	*9.96	Pinnaroo	1.54	2.89	3.08	14.70
Nullarbor	0.94	3.84	2.08	*8.62	Parilla	1.17	2.70	2.55	13.95
Fowler's Bay	1.88	5.56	2.13	11.76	Lameroo	1.30	2.73	3.14	16.19
Penong	2.02	5.55	2.22	11.94	Parrakie	1.37	2.67	2.61	14.52
Koonibba	1.80	5.91	2.11	*11.64	Geranium	1.65	3.09	2.97	16.49
Denial Bay	1.11	4.26	2.22	*11.31	Peake	1.03	2.49	3.21	16.30
Ceduna	1.32	4.52	1.66	9.82	Cooke's Plains ..	0.74	2.38	3.22	15.47
Smoky Bay	0.87	2.46	1.60	10.44	Coomandook	0.84	2.39	3.11	17.34
Wirrulla	1.39	3.14	—	*	Coonalpyn	1.57	3.04	3.48	17.51
Streaky Bay	1.65	2.65	2.38	14.91	Tintinara	1.38	2.88	3.47	18.81
Chandada	1.56	2.65	—	—	Keith	1.18	2.99	3.20	17.93
Minnipa	1.91	3.11	2.45	13.73	Bordertown	1.68	2.79	3.82	19.35
Kyanotta	1.56	2.59	—	—	Wolseley	1.95	3.07	3.59	18.41
Talia	1.84	2.69	1.73	14.76	Frances	1.25	3.10	3.76	19.94
Port Elliston	2.12	3.81	2.33	16.47	Naracoorte	2.12	4.69	4.25	22.58
Yeelanna	0.87	1.51	1.88	16.03	Penola	1.38	5.04	4.94	26.15
Cummins	0.65	1.21	1.99	17.77	Lucindale	2.04	4.90	4.08	23.07
Port Lincoln	1.26	2.13	3.26	19.45	Kingston	1.73	4.13	4.23	24.37
Tumby	0.67	1.59	2.31	14.14	Robe	1.44	3.80	4.27	24.61
Ungarra	0.87	2.38	2.37	16.83	Beachport	1.43	3.91	4.85	26.97
Carrow	0.38	1.84	2.31	13.38	Millicent	1.57	4.84	5.58	29.79
Arno Bay	0.96	2.59	2.56	12.46	Kalangadoo	1.71	5.90	5.46	32.34
					Mount Gambier ..	1.38	4.84	6.12	30.74

* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).

AGRICULTURAL BUREAU REPORTS

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch	Report on Page.	Dates of Meetings.	
		May.	June.			May.	June.
Alawoona	•	—	—	Budnada	•	4	1
Aldinga	•	—	—	Burella	•	9	18
Allandale East	•	1	26	Burella Women's	•	6	8
Alma	•	—	—	Everard East	1084	29	26
Amoyton	•	—	—	Farrell's Flat	•	—	—
Angaston	•	—	—	Finniss	•	—	—
Appila	1083	1	5	Gawler River	•	—	—
Appila-Yarrowie	•	—	—	Georgetown	•	—	27
Arbunton	•	—	—	Geranium	•	2	27
Ashbourne	1111	—	24	Gladstone	•	30	26
Auburn	•	—	—	Gladstone Women's	•	1	12
Auburn Women's	•	29	—	Glencoe	•	8	9
Balaklava	•	25	22	Glossop	•	12	—
Balhannah	1113	—	—	Goode	1098	—	3
Barnara	•	—	—	Goode Women's	•	6	3
Beetaloo Valley	•	—	1	Greenock	1087	6	8
Belalie North	•	—	—	Green Patch	•	4	25
Belalie Women's	•	12	9	Gulnare	•	—	—
Berri	•	—	3	Gumeracha	•	—	1
Big Swamp	•	—	—	Halldon	•	4	—
Blackheath	•	—	4	Hanson	•	—	—
Black Rock	•	7	30	Hartley	•	—	—
Black Springs	1087	26	30	Hawker	•	27	2
Blackwood	•	—	8	Hookina	•	5	—
Block E	•	—	—	Hoyleton	•	—	15
Blyth	•	15	19	Inman Valley	•	18	18
Booloroo Centre	•	1	26	Ironbank	•	21	—
Boolgun	1105	—	—	Jamestown	•	—	17
Boor's Plains	1094	7	4	Kalangadoo Women's	•	20	13
Borrika	•	—	—	Kalangadoo	•	9	—
Bowhill	1104	—	—	Kalyan	•	12	17
Brentwood	•	7	4	Kangarilla	•	20	—
Brinkley	•	—	24	Kangarilla Women's	•	—	18
Brinkworth	•	—	1	Kanmantoo	•	21	16
Brownlow	•	—	—	Kanni	•	—	—
Buchanan	•	—	—	Kapinnie	1098	—	—
Bugle	•	12	9	Kapunda	•	—	—
Bundaleer Springs	•	—	—	Karcultaby	•	8	12
Bunora	•	2	1	Karoonda	•	—	—
Bute	•	21	18	Keith	•	—	3
Butler	•	—	—	Kelly	1098	—	25
Calca	•	—	—	Ki Ki	•	2	27
Calph	•	—	—	Kilkerran	•	—	—
Calowie	1084	5	2	Kongorong	•	5	25
Canowie Belt	•	—	—	Koolunga	•	—	—
Canowie	•	—	24	Koonibba	•	—	—
Carrow	•	—	24	Koonunga	•	—	25
Chandada	•	—	—	Koppio	•	—	—
Charra	•	—	—	Kringin	•	—	1
Cherry Gardens	•	2 & 30	27	Kulkawirra	1105	4	1
Chenfield	•	—	—	Kyancutta	1100	12	9
Clare	•	5	2	Kybybolite	1077	5	2
Clarendon	•	—	1 & 29	Lameroo	•	2	2 & 30
Clere	•	7	4	Langhorne's Creek	•	—	27
Cobdogla	•	—	—	Laura	•	—	24
Collie	1097	6	3	Laura Bay	1101	12	27
Colton	•	—	—	Lenwood and Forest Range	•	—	—
Coomandook	•	29	26	Light's Pass	•	—	—
Coomalpyra	•	—	—	Lipson	•	2	1
Coomawarra	•	—	4	Lone Gum and Monash	•	—	27
Cooberie	•	—	—	Lone Pine	•	—	24
Copeville	•	—	—	Longwood	•	—	—
Coolta	•	—	—	Lowbank	1106	—	24
Coodak	•	8	—	Loxton	•	8	12
Coomins	•	—	12	Lucindale	•	—	—
Cungena	•	—	—	Lyndoch	•	—	30
Currency Creek	1113	4	1	McLaren Flat	•	—	—
Cygnet River	•	—	—	MacGillivray	1114	—	30
Darke's Peak	•	—	—	Mallala	•	18	15
Dudley	•	—	—	Maltes	•	—	30
Edinburg	•	—	—	Mangalo	•	—	—
Elbow Hill	•	26	30	Mannanarie	•	—	—

INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		May.	June.			May.	June.
Aarama	•	—	—	Roberts and Verran	†	—	—
Meadows	•	—	24	Rockwood	•	4	1
Meribah	•	11	8	Rosedale	•	—	—
Milang	•	9	18	Roseworthy	•	—	—
Milendilla	•	—	25	Rosy Pine	•	—	—
Millicent	†	29	26	Rudall	•	—	23
Millicent Women's	†	15	19	Saddleworth	1091	1	26
Miltalie	†	2	27	Saddleworth Women's	•	6	2
Mindarie	•	1	5	Sallsbury	•	12	9
Minnipa	•	—	—	Salt Creek	•	—	—
Modbury	•	—	—	Sandalwood	•	—	—
Monarto South	†	—	—	Scott's Bottom	•	2	27
Moonta	•	—	—	Shoal Bay	1118	—	23
Moorlands	†	—	3	Smoky Bay	1101	2	6
Moorook	•	—	—	Snowtown	•	8	12
Moorhead	†	1	26	South Kilkeran	•	—	23
Morphett Vale	•	—	—	Spalding	•	—	—
Mount Barker	1086	—	24	Springton	†	6	3
Mount Bryan	•	7	4	Stirling	•	—	—
Mount Compass	1080	8	12	Stockport	•	—	—
Mount Gambier	•	—	23	Strathalbyn	•	5	2
Mount Hope	1116	—	—	Streaky Bay	•	22	26
Mount Pleasant	•	—	—	Tallam Bend	•	7	4
Mount Remarkable	•	—	—	Talla	•	29	26
Mount Schank	•	—	—	Tanlacoola	†	2	6
Mudamuckla	•	9	13	Taplan	•	—	—
Mundella	†	28	25	Taragoro	†	28	—
Murray Bridge	•	—	—	Tarowie	•	—	—
Murraytown	†	—	—	Tarlee	•	—	—
Mypolonga	•	—	—	Tatara	•	—	—
Myra	•	—	24	Thrington	•	—	—
Nantawarra	†	—	25	Tintinara	†	—	—
Naracoorte	•	9	13	Truro	•	11	18
Narridy	•	7	6	Tulkinara	•	—	4
Narrung	•	—	—	Twedvale	•	—	4
Nekahaby	•	—	—	Two Wells	•	—	—
Nekahaby Women's	•	28	—	Ungarra	•	7	4
Netherton	†	—	24	Upper Wakefield	†	—	—
New Residence	•	—	—	Uraidla and Summertown	•	4	1
North Booborowie	•	—	1	Velch	•	—	—
Nunakompta	•	—	25	Virginia	•	—	—
Nunkeri	•	—	24	Walkerie	1108	8	12
O'Loughlin	•	11	8	Wallala	•	13	10
Orroroo	•	—	—	Wanbi	†	27	24
Overland Corner	1107	26	23	Wandcarah	•	—	—
Owen	1089	1	26	Warcowie	†	26	30
Palable	†	—	—	Warcowie Women's	†	—	—
Parilla	1075	12	9	Warramboo	†	—	23
Parilla Women's	†	15	19	Wasleys	•	14	11
Parilla Well	•	4	1	Wasleys Women's	†	7	4
Parilla Well Women's	•	26	30	Watervale	•	—	—
Parrakie	1075	—	—	Waurattee	•	—	23
Parrakie Women's	†	26	23	Weavers	†	11	8
Paruna	•	1	5	Wepowie	†	18	22
Paskeville	1096	26	30	White's River	•	12	9
Pata	•	1	5	Whyte-Yarcowie	•	—	—
Pennehaw	•	—	—	Wilkawatt Women's	†	19	23
Penola	†	2	6	Williamstown Women's	†	6	3
Penwortham	•	—	25	Williamstown	•	—	—
Petersville	†	—	23	Willowie	•	25	22
Petina	•	23	23	Wilmington	•	10	16
Pinbong	1101	—	—	Windsor	•	—	—
Pinkawillinie	1101	—	—	Wirrabara	†	—	—
Pinnaroo	1076	—	—	Wirrilla	•	2	27
Pinnaroo Women's	†	1	5	Wirrilla Women's	†	7	4
Poochera	•	—	—	Wirrulla	•	20	17
Port Elliot	1116	16	19	Wolsley	†	11	8
Pygery	†	2	27	Wudinna	•	—	—
Quorn	•	—	—	Wynarka	•	—	—
Rameo	•	—	1	Yacka	•	—	—
Rapid Bay	1116	14	11	Yadnarie	1101	28	23
Redhill	•	—	—	Yallunda Flat	•	—	—
Rendelsham	1080	2	27	Yandiah	†	8	12
Renmark	1108	—	—	Yaninee	•	—	—
Rhynie	•	—	—	Yantanahie	•	—	—
Richman's Creek	•	—	26	Yeelanna	1101	—	24
Riverton	•	11	8	Yorkestown-Melville	•	—	—
Riverton Women's	•	—	—	Youngusband	1109	—	—
				Yurso	•	—	—

• No report received during the month of April.

† Held over.

x In recess.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

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REPORTS OF BUREAU MEETINGS WOMEN'S BRANCHES.

PARILLA (Average annual rainfall, 13.95in.).

April 15th.—Present: 14 members.

HOUSEHOLD HINTS.—The following useful household hints were brought forward :—(1) When frying potatoes and it is desired to keep them from mashing in the pan, slice them as usual and then sprinkle with vinegar. (2) An economical way to clean windows and mirrors is the use of wet newspapers made into a pad, then polish with dry soft newspapers made into a pad. (3) Be sure that the teapot is thoroughly clean inside; once a week scald same out with boiling water and soda. (4) If tea towels leave fluff on china, pass them through a weak solution of starch water. (5) If boiling water is poured over potatoes which are to be baked, they will not take so long to cook. (6) Pastry that is to be served cold should be mixed with milk, which will keep it short and crisp. (7) Minced meat mould.—A good way of using up cold meat—Mince up pieces of cooked meat, season to taste with nutmeg, pepper, and salt, break into this an egg and add about three-quarters of a cup of milk, beat all together, put into basin or mould and steam three-quarters of an hour. (8) To cut new bread, dip the knife in hot water. (9) Cooking greens.—A small piece of butter added to the water will prevent them boiling over and also prevent odours filling the room. (10) One teaspoon of salt added to the water when boiling eggs will prevent cracking. (11) Sheets of newspaper threaded with string and hung in a handy place in kitchen are useful. (12) Lemon rind rubbed on white wood such as breadboards, &c., makes them white as snow. (13) Add a little vinegar to the water in which eggs are to be poached, and they will not spread.

PARRAKIE (Average annual rainfall, 14.52in.).

March 24th.—Present: 13 members, three visitors.

CURING MEAT.—Mrs. Beelitz read the following paper :—"The most important part of curing meat is to have a clean and good barrel or earthenware jar. *Curing Tongue.*—Throw a handful of salt over the tongue, seeing that it is sprinkled on both sides, and let it remain to drain until the following day, make a pickle of one-half tablespoonful saltpetre, one tablespoonful plain salt, and one tablespoonful of coarse sugar. Rub this mixture well into the tongue every day for a week, it will then be found necessary to add another tablespoonful of salt; in four more days the tongue will be cured sufficiently. Sometimes the tongue is merely left in the brine and turned daily; this method will be found to occupy a month or five weeks before the tongue is cured. *Mutton Hams.*—Choose fat, sound, mutton; rub the hams with a mixture of sugar, pepper, and saltpetre, allowing 4ozs. of the former and 1oz. each of the two latter to every 12lbs., and 1½lbs. salt to the same quantity. After the meat is thoroughly rubbed, cover it with salt, and turn and beat it every day. At the end of a week add one teacupful of vinegar to the brine,

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and continue turning and beating. After three weeks, take it from the brine, wash with fresh water, then with strong vinegar, and hang in a cool cellar for a week or less, according to the weather. It should be soaked in cold water about one hour before boiling. (2) Three gallons soft water, 1lb. coarse sugar, 3lbs. of common salt; boil and remove scum, and, when cold, pour over the meat. In two or three weeks the meat will be excellent for baking or boiling. It may be smoked if preferred. *Ham and Bacon*.—As soon as the animal heat has disappeared, salt with plenty of the purest salt and about 1oz. saltpetre to 100lbs. meat (pork). As soon as the meat is salted to taste, which will generally be in about five weeks, take it out, and if any of it has been covered with brine, let it drain a little, then take black pepper, finely ground, and dust all over as much as will stick, then hang it up in a clean, dry, airy place. (2) Dissolve salt in cold water until it will float an egg; then for 12lbs. of ham add 1oz. saltpetre dissolved in water, and add it to the brine as you pour it on the meat. Have a skewer made of iron a few inches long, sharp at one end, with a hole in it large enough to pass stout twine through; with it put strings in the leg end of hams before putting in the brine, then pack tight in the cask, with the string end up. They will be ready to smoke in six weeks, but standing longer will do no harm. Have them smoked and hung in a cool place. A smoke-house should be dark, and the smoke so supplied as not to heat the meat." (Secretary, Mrs. M. Cabot.)

PINNAROO. (Average annual rainfall, 14.70in.).

April 10th.—Present: 11 members.

BEEKEEPING.—Mrs. Phillis read the following paper:—"In this paper I propose to tell in a simple way how to keep a couple of hives of bees, so that there will always be a supply of fresh honey for home use. Obtain a clean petrole case, take one side off, and nail up what was the top of the case, then by means of a cleat allow about 1in., so that the bees can pass comfortably in and out. This opening should not be too large, because of the danger of moths getting in. The case is then stood on a table or piece of board wider all round than the box, thus forming the bottom. It is a good plan to have the hive set up on a stand so that the legs of the stand can be stood in tins. These should be kept filled with water to keep ants from getting into the hive and, at the same time, provide the bees with water. In good seasons, when there is an abundance of flowers, honey can be taken from about four to six weeks after the swarm has been boxed. Do this early in the morning, when all workers are away gathering supplies. Also it is cooler, and the comb can be handled more easily than when it is softened by the heat of the day. A smoker is used so that a little smoke can be puffed in to move any bees that may be clinging to the honey that is to be taken out, it is then easily removed without injury to the bees or the comb. Straining the honey is the next job. Apiarists use an extractor, but for small lots, 1yd. of cheesecloth will be quite satisfactory. Break up the comb by mashing with a big spoon or knife so that all the honey cells are broken, hang up in a cool place, and allow it to drain into a large dish or preserving pan, and in a short time clear honey will be ready to put in the jars. The wax must not be wasted. Empty it into an old saucepan or other convenient vessel with some water, and put it over the fire to melt, skimming off any dark or waste matter. When cold and set the beeswax can be used for many jobs. There is always a good price offering in the market should there be more than required for home use." (Secretary, Mrs. F. Atze.)

FRUIT PRESERVING.

During the course of an address on "Home Preserving of Fruit" to members of the Wilkawatt and Parrakie (Women's) Branches, Mr. J. B. Harris (Horticultural Instructor) referred to the ripening periods of various fruits which were recommended for the process. A list of fruits has been compiled from records at the Blackwood Experiment Orchard, and Mr. Harris points out that fruits in the Murray Valley would probably ripen about a week ahead of the following dates, which correspond with the time when the first picking for market takes place:—*Cherries*—Waterloo and Florence, December 1st to 8th. *Apricots*—Moorpark, January 4th to 10th; Tilton, December 30th to January 4th. *Plums*—Greengage, January 24th to 30th; Angelina Burdett, January 10th to 18th; Coe's Golden Drop, February 17th to 21st. *Pears*—Duchess, January 31st to February 12th; Peckham's Triumph, February 22nd to 28th. *Peaches*—Fuller's Cling, March 20th to 25th; Goodman's Choice, March 3rd to 7th; Golden Queen, March 2nd to 5th; Elberta (freestone), January 29th to February 5th; Salwey (freestone), March 7th to 14th.

Summary of Meetings, etc.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Goode	4/3/31	7	Sewing Evening	Mrs. A. Watson, Ceduna
Gladstone...	13/3/31	16	Discussion on Wirrabara Conference	Miss J. Sargent
Kangarilla .	14/2/31	—	Dance in aid of Hospital Funds	Mrs. A. Steer
Kangarilla .	19/3/31	9	Formal	Mrs. A. Steer
Belalie	10/3/31	14 and 6 visitors	Needlework Demonstration, Mrs. R. Humphries	Mrs. E. Orchard, Jamestown
Belalie	14/4/31	17 and 13 visitors	Papers read at Wirrabara Conference	Mrs. E. Orchard, Jamestown
Auburn	27/3/31	12 and 4 visitors	Washing Machine Demonstration, Miss P. Hean. Papers: "Washing Day," Mrs. Buirfield; "Washing Silk," Mrs. L. Giles	Miss Dennison
Pinnaroo ...	2/3/31	9 and 3 visitors	"Fruit Preserving Demonstration," Mr. J. B. Harris	Mrs. F. Atze
Williamstown	1/4/31	9	Paper, Miss W. Cundy	Mrs. G. Cundy
Parilla	4/3/31	20 and 6 visitors	"Fruit Preserving Demonstration," Mr. J. B. Harris	Mrs. R. Welden
Belalie	10/2/31	13 and 7 visitors	Annual meeting	Mrs. E. Orchard, Jamestown
Wilkawatt ..	17/3/31	8	Recipes	Mrs. W. Pritchard
Wilkawatt ..	21/4/31	9 and 17 visitors	Social Afternoon	Mrs. W. Pritchard

SOUTH-EAST DISTRICT.

KYBYBOLITE (Average annual rainfall, 22in.).

At a meeting held on September 2nd, attended by 16 members, Mr. F. Martin read the following paper, entitled "Dairying for the Beginner":—*Buildings and Locality.*—Pick a well drained spot, if possible, and lay out the yards and sheds for quick handling of stock and foodstuffs. I personally favor milking while cows are feeding. In building the shed, do not stint room for the feeding race. The quickest way of handling chaff is in two kerosene tins, one in each hand, and there should be room to walk down the race with them. Have the piggery and calf pens and runs as handy as possible, or else there is a certain amount of neglect when in a hurry. Have the paddocks arranged so that dry stock can come after milkers to clear up hay, for there is always a certain amount of waste with a milking herd. Subdivide as much as possible; subdivision and rotational grazing are one of the surest ways to success. Avoid races, but if unavoidable make them a chain wide. See that you have an abundant supply of water. On cheap land, every effort should be made to plant breakwinds. Have shady trees for hot weather. A good straw shed is an asset. I do not favor bedding cows down at night. The cost of handling does not warrant it where there is plenty of shelter, and it causes bad udders.

Building up the Herds.—Good dairy cows are scarce and expensive. The saleyards mostly contain culls, and if one cannot buy direct from reputable dairymen, I prefer buying yearlings of good dairy type of the favored breed, or heifers in calf or springing. If heifers turn out duds, one can get out without much loss, whereas there is considerable loss on cows at, say, £15 a head. When looking a cow over with view to purchase, first get behind and see that she is broad across the pins, and well let up towards the tail, with udder coming well up. She should be well defined and strong looking at the hindquarters. I do not like a round, heavy-looking beast from this view. From side view, see that her udder runs well forward, and that there are no traces of a lopsided or lumpy udder. I like to see a cow long from the point of the hip to the pin bone, especially so in balls, it generally means good uddered stock. Avoid tight-chested and narrow-gutted cows, they are generally poor producers, and more subject to bloat than the deep ones. Avoid narrow-headed, pig-eyed cows, they are generally bad tempered, and poor producers.

In general appearance the cow should be strong, well defined, yet fairly fine. Often rather heavy pointed heifers milk the heaviness off after a month or so. She should look a bundle of energy, showing good nervous system, with a good network of veins underneath. Avoid heavy, sluggish, tight-skinned beasts. The bull should be the best one can afford to buy, backed by a good butterfat record. See that he is kept in a yard or good paddock. If in a yard, he needs a run every little while. *Breed.*—Any of the light breeds should be suitable for most of the South-East. I prefer Ayrshires. I do not favor heavy and so-called dual purpose breeds. The only advantage of these is a better calf and carcass when the cow is finished, but bear in mind her maintenance is far greater; 60 per cent. of food consumed goes in maintenance.

Growth of Cows from Calves.—When the cow is due to calve, bring her into a field handy for observation. Do not worry her while calving. Leave the calf with her for 24 hours, ease her udder a little, but do not be in a hurry to milk her right out, as it may cause milk fever. Should she go down with milk fever, take her calf away immediately. Only under exceptional circumstances milk her before calving. The calf should be fed on 1 gall. of fresh milk for three or four weeks, and then gradually brought on to skim milk with addition of boiled linseed. I have not much faith in calf foods, they are too expensive. Keep them away from solid foods for two weeks, then give a little crushed oats or good hay, and the run of a good paddock. I prefer feeding calves in small bails; they do not forget it when coming into milk. Dehorn all calves you intend keeping. See that the paddocks are well fenced, for once they start the crawling habit, you will never break them of it. Keep them in good growing condition, but do not get them too fat. A heifer should be mated at about 18 months, if well forward she may be put to the bull earlier. When a heifer has calved, handle her gently. Avoid the use of a leg rope if possible. When necessary, use a figure 8 around the hocks, or place the leg rope high up. A very important point is to keep them in milk until six weeks from calving, letting a heifer dry off three or four months before calving is ruination; they acquire the habit, and you cannot break them of it. I believe there is a good deal in favor of bringing all the cows in as near as possible at the same time; it gives one a well-deserved rest, and allows you time to have the plant overhauled, etc. No one can foretell the price of butterfat for any period ahead, so one must aim at bringing cows in at such time that they will get the most milk possible over a lactation period at a minimum cost. To my mind the best time is two or three months before there is a good bite of grass in the paddocks. Under these conditions they have not gone stale by the spring, and will be flush again with the bulk of food, whereas if they have been in milk four or five months, they do not show much appreciable increase. Feed the dry stock through winter. If a cow calves in the spring, she gets about three months of good cheap feed, and then hand feeding must be resorted to. It is far more expensive to keep a cow going after the flush of feed than two or three months before. With winter dairying, the cows have all calved and settled down by shearing, and the calves do not need so much attention. With spring cows a good deal of trouble will be experienced right at the busy time. By harvest, the winter cows are easing off in the milk flow, and by seeding and manuring time, they are only just starting to come in, so that you have the busiest time with cows when other work is not so pressing. Generally under these conditions, pigs can be marketed before they drop in price, as they usually do about November. The calves of the winter drop do far better than those of the spring drop, and most of the cream will have been disposed of before hot weather sets in. Very hot weather is trying to a cow with a large flow of milk.

Feeding.—During autumn and winter I feed a cow on about 2 lbs. of concentrates with a little chaff for a week or so before calving. It has been my experience that they milk all the better for it. Always bring in the cows in good condition; if poor, it takes a lot of feed and a lot of butterfat is lost before she gets into good working order, for, bear in mind, she is a reproducing machine, producing butter from foods consumed. I do not believe in feeding fair average cows on more than 5 lbs. of concentrates per day. The latter should be given with chaff hay. It is a good plan to give cows a little dry chaff, and perhaps 1 lb. of crushed oats right through the spring; cows often look for dry, solid feed when other feed is sappy and green, it tends also to reduce the bloat. In a district with a bulk of good spring grass, good clover hay and ensilage are the most economical foods to handle. With the aid of the push rake and stacker, ensilage is not an expensive food; a silage crop yields six or seven times the amount of hay per acre, it is there for ever, and you are always sure of a plentiful supply of good, succulent food when wanted, whereas with the growing of summer crops, too much depends on rain, and it is doubtful whether they will yield as much fodder per acre. Summer crops are expensive to handle, and with winter dairying there is not so much necessity for them. Should one be fortunate to have a good supply of irrigating water, it is best to sow down pastures, irrigate, and let the cows do the rest. When spring is well advanced, do not wait until the cows drop considerably before you start feeding; feeding at this time of the year only has the effect of keeping up the flow of milk, and dairymen are inclined to think it unprofitable to feed because there does not appear any apparent gain. Try the experiment yourself. Take two or three cows, and start feeding on a little concentrate with silage as soon as they start to go off, and compare them with the others in three or four weeks' time; the results will surprise you. Once the cow's supply has dropped considerably, it is waste of money trying to get her back. Always try to shut up a few acres in winter for early feed. I mentioned previously rotation grazing. This entails fencing in about five-acre fields for a herd of about 35 cows. A fence I have found very effective is three plain wires and two barbs on top. Graze the fields in rotation, and keep

growth down to about 4in. Cows do far better on short feed, the carrying capacity per acre is greatly increased, and it allows for the shutting of up paddocks for hay. These short-grazed paddocks make excellent fields for sheep. They remain green a little longer, and the system pays handsomely. Once grasses have dried off, they are useless from a production point of view, but they are good fields for dry stock and for fattening. *Milking Machines.*—There is a good deal to be said in favor of milking machines where there are over 10 cows per milker. They are an economic necessity. One man can handle comfortably a two unit plant, which should milk 14 to 16 cows an hour. I especially like the bucket type, which can be used in the feeding shed. From the point of view of sanitation, they are equal to, and perhaps better than, hand milking. Where they are neglected, they are a curse. They require a fair amount of attention, and certainly take longer to clean up, but given reasonable care and intelligent handling, they are in no way injurious. I have seen cows with out teats that were painful to milk by hand, stand quiet when the machines were put on. While on the cows, they should be closely watched, and taken off as soon as the milk tube on the claw cools off. Leaving on too long, is one of the main causes for cows holding their milk. I do not think it pays to put the machines on a cow when giving less than 5lbs. at a milking. I am inclined to think that you get more milk over a lactation period from good hand milking than machines. Machines need steaming, or else putting in limewater or a weak formalin solution between milkings. A good class of steamer for machines and milking utensils and separator parts is to have a copper, put in a little water, then let in a netting tray above the water, put in buckets, &c., after being washed, cover them over, and let them steam for a time. Always take the separator bowl to pieces and clean it after every milking. *Washing Cows' Teats.*—This does not seem much, but is the most neglected part of the cleanliness in a dairy; too many just wet them and allow the hands or machines to do the rest of the cleaning. They should be thoroughly washed and dried. Always use a weak Condy's solution; see that the rag used for washing is thoroughly cleaned and aired. Always squirt the first couple of testfuls of milk on to the floor. Keep the cream in a cool, well-aired place, and send to the factory three times a week in summer. Always remember, do not sell the other man what you would not use yourself. If all the cream produced was of good quality, there would not be the necessity for importing butter from other States. Treat the cows with gentleness, and one factor that plays an important part in success in dairying is to practically milk by the clock. Always start as near as possible at the same time daily. (Secretary, Mr. F. Martin.)



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MOUNT GAMBIER (Average annual rainfall, 30.74in.).

November 14th.—Present: 10 members.

USEFUL PLANTS AND SEEDS.—Mr. A. Kipselbach read the following paper: "Caraway.—This is a plant that grows well in our district, it is a perennial that seeds very heavily. I have some two years old in my garden at present, and anyone wishing to try it I will give them seed. Hundreds of tons are imported. Linseed (or flax).—This grows well here, in fact it is a native of Mount Gambier. In the early days it could be found growing amongst the grass in many parts of the district, especially north-west from the town. The best place to grow it would be near the Dismal Swamp, where there is plenty of water so that the fibre could be used as well as the seeds. Sugar Beet.—This was tried here somewhere in the sixties, but turned out a failure, as the tonnage was too small, and as there was no chance of getting a sugar mill started here, consequently it was only used for pigs. Tantanoola and Rendelsham are more suitable for the sugar beet, which



B. Kannenberg's winning entry of Up-to-date variety in the Mt. Gambier Potato Crop Competition.

demands black, rich soil. Berries.—These ought to be grown more plentifully here. The soil and climate suits them well, especially loganberries, raspberries and strawberries. These three bear remarkably well. Silver Beet.—This is a most useful plant. It will thrive in any soil and is green all through the hottest summers. It requires no cleaning, and will grow like a weed. Simply cultivate the land and broadcast the seeds with Cape barley or oats. When the barley and beet is about four to six inches high turn stock into it or mow it off. The more it is cut the better it grows, and if kept cut and fed down it will stand for two or three years. The best time to sow it is about March or April, and again in September and October, and even into November. It is far more nourishing than chow moolie and less trouble to feed to stock. Hundreds of acres are grown in the lower North to fatten sheep.

Congress reports were received and discussed at the meeting held on October 10th, which was attended by 12 members.

Meeting held December 12th. Present: nine members. A paper, "The Blowfly Pest," was read from the *Journal* and an instructive discussion followed. (Secretary, Mr. G. Gurry.)

RENDELSHAM.

November 8th.—Present: 12 members and two visitors.

Mr. S. Smith read several extracts dealing with the cultivation of the potato. The meeting held on December 6th took the form of a "Question Box." "When is the best time to cut rye for hay?" The majority of members favored cutting on the green side. "Is fruit taken from a tree after being sprayed with arsenate of lead safe to eat?" It was thought that if it was sprayed with ordinary strength when fruit was young there would be no danger. "What color flowers have the following potatoes:—Carmen, Snowflake, and Up-to-Date?" The answer was—Carmen, white; Snowflake, blue; and Up-to-Date, purple. "Can you tell the color of the potato flower by the shoot?" Yes, they are the same color. "Do cut potatoes throw shoots from the opposite end to the crown?" It was thought advisable, where possible, to cut

the potato lengthways, in order to get part of the crown on each side, especially with Carmen and Up-to-Date. "How thick should mangel seed be sown?" About 2lbs. per acre. "What is considered the best method of supering potatoes?" Best results in this district were usually obtained by supering by hand. (Secretary, Mr. F. White.)

March 28th.—Present: 13 members, four visitors.

THE DAIRY COW.—The following paper was read by Mr. C. Faehrmann:—"Many farmers in this district, who were chiefly occupied in the production of wheat, owing to the falling prices in wheat, have turned their attention to dairying, and have established fodder plots and installed milking machines on their premises. Their chief reason is that cream invariably returns them regularly 'ready cash', which, in existing times, is most essential, while their wheat returns, owing to fluctuations, are so uncertain. With all the natural possibilities and suitable land available in this district, which carries an abundance of natural grasses, there is a splendid opening for an enthusiastic farmer, to establish a good dairy herd, commencing on a small scale with good sound stock, and with that end in view the following points may prove helpful to the prospective farmer in selecting a good type of cow as a nucleus for his herd. *Production Factors and Essential Characteristics of the Ideal Dairy Cow.*—To be successful in dairying a man must have many attributes, but above all he must be a good judge of dairy cows. No one can hope to tell from the appearance of a cow how much butterfat she will yield. This has been demonstrated repeatedly ever since herd testing began. The really only reliable guides are the scales (weighing) and the Babcock Milk Tester. Unfortunately, however, cows cannot always be purchased on their test records, and in purchasing new blood, or building up a herd of his own, the dairy man who has a sound knowledge of the essential points of a dairy cow will make fewer mistakes than the man who has not that knowledge. It must be borne in mind that to all intents and purposes the dairy cow is a 'machine' for the reproduction of her kind and for the production of milk and butterfat. Her commercial value depends on the quantity and quality of her production, and her ability to maintain her productiveness over extended periods. If the 'machine' is to function properly and profitably certain characteristics are essential. Among these the most important are—(1) Constitution, (2) capacity, (3) nervous temperament, (4) blood circulation, and (5) ability. Each of these characteristics enumerated are so vitally important, that it is difficult, if not impossible, to say which is most essential. Unless they are all in their proper development, profitable production cannot be expected. These essential characteristics are not confined to any particular kind (breed) of dairy cow more than another. The choice of a particular breed is only of secondary consideration and a matter of personal preference of the farmer. The important thing to ascertain is, that the cows that are selected have the above characteristics. If she is to produce satisfactory quantity and quality of milk, a cow must have 'capacity', and if she is to continue the good work throughout her lifetime, she must have a vigorous constitution and abundant vitality. Constitution in a cow is determined by a number of factors, foremost of which is 'ample breathing capacity'. Oxygen is essential for the purification of the blood, and if the cow is to receive the required amount of air, a large breathing capacity is required. This is demonstrated by a good lung capacity and large, open nostrils. If the nostrils are small and not well opened, the amount of oxygen which reaches the blood through the lungs is restricted and constitutional vigor is under-developed. Small nostrils are a definite indication of low breathing capacity. The vitality of the animal is determined partly by the size and capacity of the chest, within which are located the heart and lungs. The dairy cow should be deep in proportion to her size, from the top of the shoulder to the base of the chest. To give the vital organs ample room for development and action the fore ribs should be well sprung, but not broadened out into the widespread of the beef animal. Another indication of the vitality of a dairy cow is found in her eyes. Bright, clear, and prominent eyes are evidence of vigor, while the cow with dull, sunken eyes is usually the animal to be avoided. By capacity, is meant the total amount of feed she can consume and digest, while her profitable capacity lies in the amount of feed she can assimilate above the quantity required for her own bodily maintenance. Usually cows which are big feeders are more profitable than those of a smaller capacity, as they are less dainty in their tastes and will consume a greater proportion of the more plentiful and coarser roughages. Cows with limited capacity are more likely to go off their feed and get out of condition with the result that their milk flow also falls away. A cow must, therefore, be fed heavily if she is continually in milk. A large mouth is a matter of prime importance. A large mouth indicates a good feeder, and the best evidence of capacity is a large barrel. This is accompanied generally by length of body with broad, deep, and well sprung ribs, and a large girth measurement in proportion to the size of the animal. Breadth and depth of body are more desirable than length. Lengthy bodies without the well sprung ribs indicate generally a poor feeder, a poor producer, and a poor mother. The condition of the hair and skin must next be taken into consideration. The cow with a hide that is soft and pliable, easily lifted from the body, and covered with a soft silky coat of hair is in good condition and has her digestive apparatus in proper working order. Dull eyes, harsh skin, and wiry coat are indications of digestive troubles. So far as 'Nervous temperament' is concerned, a dairy cow should have a strongly developed nervous system to enable her to carry on with milk production and her offspring. The term 'Lymphatic temperament' is essential for beef cattle. These two temperaments are contrasts. The 'Lymphatic' enables the animal

to lay on 'beef' while the 'nervous temperament' enables the dairy cow to lay on 'milk' (i.e., they may eat the same food but make different uses of it). Nervous temperament is indicated by a long, broad forehead with plenty of space between the eyes. Other indications are prominent, large and intelligent eyes. Freedom from 'beefiness', absence of surplus bodyfat, and extreme angularity of form, with prominent hip bones and ribs are also evidence of the desired nervous temperament. Blood circulation is next in importance. Unless the cow has a good circulatory system she cannot derive the maximum benefit from the food consumed. The 'milk' veins which extend forward from the udder are actually blood veins, and their size, length, and form serve to determine the quantity of blood which flows through the udders. These veins terminate in the so-called 'milk wells' which are the openings in the abdominal wall where the veins re-enter the body. Usually, both the 'milk veins' and the 'milk wells' are large in heavy-producing cows. With large production the veins may be also very crooked, and have several branches, with as many milk wells. Therefore, the development of the system of milk veins is one of the best indications of milk production capacity of the cow. The fifth characteristic—the ability to produce—is not merely the capacity of the cow for milk production. She may have the capacity and yet lack the ability to produce up to that capacity. By capacity is meant that the cow can consume, digest, and make use of, or assimilate large quantities of feed; while ability means that she can turn the nutriment elements of that food into milk and butterfat. It is, perhaps, the most important of all the characteristics, for without it the others are of little avail. The size, form, and texture of the udder are practically the only indications or outward manifestations of her ability. The udder should be long and broad, attached high behind, and extending well forward. Its breadth should fill the space between the thighs, and it should have a nearly level bottom line parallel with the underline of the body. A deep pendulous udder is undesirable. Quality and texture are highly important in the udder. There is evidence of both when the vessel is soft and pliable, capable of great expansion when full, and equally great contraction when empty, and covered with a coat of silky hair. It should be well distended and smooth before milking, and should gradually collapse in numerous soft folds when the milk is withdrawn. Though the foregoing are not infallible rules, a knowledge of the essentials and characteristics outlined above are necessary for the dairy farmer who hopes to build up a first-class herd. Used sensibly and in conjunction with testing, that knowledge should provide both profit and pleasure to the owner, for there are few more occupations more interesting than the breeding of high-class livestock, and particularly dairy cows." (Secretary, Mr. F. White.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Wolseley ...	8/12/30	22	Papers—"Pool v. Open Market," Mr. E. Sharrad; "Visit to Salisbury Experimental Plots," Mr. Grosser	E. Sharrad
Tantanoola .	7/2/31	12	Discussion—"Land Taxation"	H. Kennedy
Mt. Gambier	13/2/31	16	Paper—"Forecasting the Weather," Mr. H. Hemmings	G. Gurry
Penola	6/2/31	10	Debate—"Horses v. Tractor"	H. Richardson
Allandale East	30/1/31	12	Question Box	T. Earl
Kybybolite .	4/10/30	13	Address—"The Farm Water Supply," Mr. S. Shepherd	F. Martin
Kybybolite .	6/11/30	19	Address—"Woolclassing," Mr. A. H. Codrington	F. Martin
Kybybolite .	2/12/30	19	Paper—"Foot Rot in Sheep," Mr. Bayliss	F. Martin
Kybybolite .	2/1/31	6	Paper—"Sex Control at Birth," Mr. L. J. Cook	F. Martin
Kybybolite .	3/3/31	16	Debate—"Merino v. Crossbred Sheep," Messrs. Irving and Schinckel	F. Martin

Summary of Meetings, &c.—continued.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Mundalla ...	28/2/31	28	Debate	A. Ross
Mundalla ...	28/3/31	8	Paper—"Wool Growing in Australia"	A. Ross
Coonawarra	5/3/31	11	Address—"Book-keeping," Mr. H. H. Orchard	J. Davis, Asst. Secretary
Rendelsham.	28/2/31	10	Paper from Congress—"Conservation of Fodder"	F. White
Mt. Gambier	13/3/31	15	Address by Mr. W. H. Downes	G. Gurry
Mt. Gambier	10/4/31	11	Address—"Tobacco," Mr. E. S. Alcock	G. Gurry
Kongorong..	30/3/31	8	Address—"The Fruit and Vegetable Garden," Mr. C. Atkin	S. Johnston
Penola	6/3/31	6	Paper—"Top-dressing Pastures," Mr. J. O'Connor	F. Hinze
Penola	10/4/31	6	Conference Report	F. Hinze
Millicent ...	27/3/31	12	Harvest Reports	E. Mitchell
Tantanoola .	4/4/31	6	Conference Report	H. Kennedy
Wolseley ...	9/4/31	15	Harvest Reports	E. Sharrad
Wolseley ...	13/4/31	10	Address—"Fallows," Mr. E. S. Alcock	E. Sharrad

UPPER-NORTH DISTRICT.**(PETERBOROUGH AND NORTHWARD.)**

APPILA (Average annual rainfall, 14.69in.).

November 7.—Present: 14 members.

The Hon. Secretary (Mr. E. H. Wurst) read an instructive paper, "Care of Motors on the Farm."

Meeting held February 6th. Present: Mr. G. Wurst (Chair), 10 members, and two visitors.—*Harvest Reports*.—Considering the rain that had fallen during the growing period for the past year, fair returns were reported by most members. Good fallow yielded up to 3bush. more than late fallow which had not been worked. Best yields were obtained from the following varieties:—Nabawa, Daphne, Sepoy, Golden Return, German Wonder, Waratah, Leatherhead, Sultan, and Currawa.

BLACK ROCK.—The meeting of November 4th was attended by Mr. C. Kuerschner (Chair) and 10 members. Mr. E. L. Orchard (District Agricultural Instructor) spoke on the subject, "Fodder Conservation." (Secretary, Mr. B. Kitto.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Warcowie ..	20/2/31	14 and 5 visitors	Address—"Drought-resisting Fodders," Mr. A. Warren	A. Crossman
Wepowie ...	23/2/31	11	Harvest Reports	E. Rooke

MIDDLE-NORTH DISTRICT.**(PETERBOROUGH TO FARRELL'S FLAT.)****CALTOWIE (Average annual rainfall, 16.85in.).****September 26th.—Present: 24 members.**

FARM ECONOMIES.—Mr. S. Bennett read the following paper:—One has to remember that farm economies and farm activities are so closely related and dependent one on the other that it is impossible to draw any very fine distinguishing line between them. Farm activities may be carried on in such a way as to be an easy and pleasant avocation, and during the seasons of a few years past more or less satisfactory, but farm activities, coupled with the most thoughtful economy, will be essential if we are to balance the budget in the present and coming seasons. During the last few years, when crops were good and prices high on account of the world's markets being not only open to us, but purchasers were prepared to, and did, pay considerably more than prewar prices for our produce, economy of practice in our activities was allowed to drop into the background. Many farmers of to-day are simply grain growers; three years ago a profitable occupation, to-day, with the ever-increasing cost of production, the alarmingly inadequate prices offered for grain, a difficult and almost hopeless position has arisen. Farmers of to-day, generally speaking, are possessed of the most up-to-date equipment procurable. The modern farmer as a grain grower is efficient, and as a result of that efficiency is left with a great amount of spare time, very little of which is spent either profitably or economically. I use the term profitably in the sense that little (if anything) is being added to your income. Most farmers to-day grade their wheat for sowing, an undoubted economy on the old methods practised, but possibly a further economy might be realised by a more careful selection of the crops as to freedom from disease and suitability to district before the grain was brought to the grader. Harvesting machines of to-day as grain gatherers are possibly the last word in efficiency, and at the same time prodigal wasters of the by-product, wheaten chaff. In searching for economy on the farm, we are searching for a means of deriving a profit from the greatest possible amount of the crop or products raised on the farm, and to allow the wheaten chaff to waste, when it has an undoubted fodder value, particularly in the winter months, to cattle, and even milking cows, is not economy. Wheaten chaff when blown out on the ground is worth practically nothing, but when saved with the view to carrying more stock, which would be marketed, or as part of the ration of dairy cows, it would undoubtedly show a profit, and is an economy worthy of consideration. At the present price of wheat, it should be advisable to have some portion of the acreage cropped, sown to oats, which not only benefit the land, but is a fodder of exceptional value in carrying stock over those periods when there is a scarcity of natural feed. Super is a costly item, and a saving might be effected by individual farmers carefully testing the yields and profits derived from the different amounts of phosphate used. If the larger outlay necessary for a heavier dressing of super meets with a corresponding profit in the yield, it is economy to use the heavier dressing. Minor repairs to plant, harness, &c., which do not require a tradesman or expert to effect, should on no account be overlooked. It is at any time a real economy, and under present conditions a vital necessity. Water supplies on the farm should, if plentiful, do more than supply the needs of the stock carried. The farm garden and some class of fodder for summer should be cultivated to the extent that the water supply and the available labor will permit. Economy that will be profitable in our activities is to make the fullest possible use of the resources of and what is grown on the farm by such sidelines as stock, dairy cows, pigs, and poultry. It means time and work; modern equipment has given the farmer the time, the farmer must give the work. The sidelines mentioned above fed on the produce raised on the farm will not prove easy money, but they may in some measure solve the difficulties with which the farmer is at present faced. (Secretary, Mr. R. Wilkinson.)

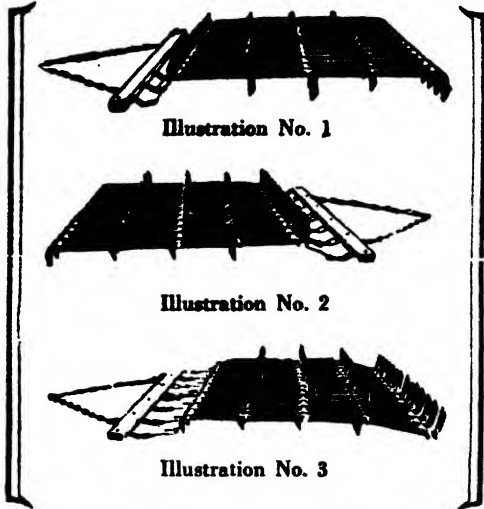
EVERARD EAST.**November 8th.—Present: Seven members.**

CURING MEAT.—Mr. F. Hughes read a paper on this subject:—“In the successful pickling of meat a great deal depends on the killing of the animal. If it is rushed about, overheated, and excited, it will not bleed thoroughly, which is very much against the appearance of the meat and is a handicap in the curing if the weather is a bit warm. If killing a sheep, it should be penned either the night before or the morning of the day it is to be killed. If killing beef and the place of hanging has not a small yard around it, I would recommend tying up the animal in the morning, then in the evening it can be shot before sticking, thus ensuring a good bleed and cool, clean meat. As pigs are generally killed in the winter, it is not so necessary to be quiet, but it is an advantage not to feed the day you intend to kill. Shoot the animal and stick in the sty so as not to overheat or excite it, and you will have the

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meat in the best condition for curing. I favor brine or wet pickle; it is not quite so much work, and if properly done, there is not so much chance (if any) of oversalting. To make a good brine, thoroughly dissolve enough salt in the water to float an egg, which should not be more than one day old. A stale egg will float in a good deal less salt and you run the risk of not having enough salt to cure the meat. If you cannot get a fresh egg, a good potato will do, but it floats sooner than a day old egg. After having floated the egg, add some saltpetre—two or three cupfuls to 100lbs. meat in good weather, twice as much if the weather is a bit doubtful. Saltpetre is used chiefly to color the meat, but it seems to help the salt to penetrate more quickly, so lessening the risk of loss, but hardening the meat a little. A handful or two of sugar will improve the flavor, but it is not necessary. A vinegar cask is a very good pickling vessel and should be kept in the coolest place possible. If you have plenty of water, the best place is outside under a heavily foliated tree with a good sized patch of wet ground about the cask. There are very few nights that do not cool enough to lower the temperature of the brine under these conditions. The meat should be reversed every day or two, according to the weather, for the first week, and just sufficiently weighted to keep it under water. When not in use, the cask should be kept full of water and emptied at least every two days in summer and never allowed longer than a week in winter; if allowed to become "smelly," it is almost useless for the purpose. If for some unknown reason the animal has not bled properly and the brine becomes bloody, it should be boiled and skimmed until clean, but if the method suggested has been thoroughly carried out, this should not be necessary." (Secretary, Mr. F. Hughes, Blyth.)

MOUNT BRYAN (Average annual rainfall, 16.79in.).

Mr. G. Goodridge presided over an attendance of 11 members and 19 visitors at the meeting held on November 11th, when Mr. W. J. Spafford (Deputy Director of Agriculture) delivered an address, "Improving Returns from the Farm." (Secretary, Mr. H. Edwards.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Appila	6/3/31	8	Report on Local Experimental Plots	E. Wurst
Appila	27/3/31	12	Wool Publicity Campaign	E. Wurst
Tarcowie ..	6/3/31	9	Harvest Reports and Address, Mr. E. L. Orchard	G. Watkins
Red Hill ...	3/3/31	8	Paper—"Wool Growing," Mr. E. Kellock	S. Pengilly
Yandiah ...	10/3/31	19	Address—"Feeding Dairy Cows," Mr. J. O. Hatter	F. Jettner
Yandiah ...	10/4/31	15	Paper—"The Future of Agriculture"	F. Jettner
Wandearah .	14/4/31	10	Annual Meeting	J. O'Shaughnessy
Wirrabara ..	9/4/31	8	Harvest Reports	F. Borgas
Gladstone...	17/4/31	—	Paper—"The Wool Industry"	F. Chick
Yandiah ...	10/10/30	12	Address—"Stock Ailments," Mr. W. C. Johnstone	F. Jettner
Yandiah ...	31/10/30	20	Crop Inspection, and Address by Mr. E. L. Orchard	F. Jettner
Yandiah ...	13/2/31	15	Harvest Reports	F. Jettner
Beetaloo Valley	2/2/31	8	Harvest Reports	J. Halse
Murraytown	31/1/31	12	Harvest Reports	E. Pitman
Wandearah .	10/2/31	10	Harvest Reports, and Address by Mr. E. L. Orchard	J. O'Shaughnessy
Caltowie ...	16/2/31	12	Address—"The Harvest of 1930-31," Mr. E. L. Orchard	R. Wilkinson
Narridy	7/2/31	14	Harvest Reports	H. Cox
Belalie North	2/2/31	8	Harvest Reports	E. Carmichael, Jamestown

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

November 4th.—Present: 10 members.

Debating the subject, "Horses v. Tractor," a team consisting of Messrs. Woolacott, Dixon, Turner, and Hogan, of the Hanson Branch, supported horses, whilst Messrs. Rodda, J. Howard, C. Dunn, and R. Turner, of the local Branch, spoke in favor of tractors. The local team was adjudged winners by 79½ points to 75½. On October 7th reports of delegates to Congress were received.

GREENOCK.

Thirty-seven members and several visitors attended a meeting held on September 15th. Mr. M. Laucke read a paper, "Wheat for Milling." He said that soundness was the outstanding factor in the choice of wheat for milling purposes. Regardless of any points of quality which a wheat might possess, such as high test, weight per bushel, or high protein content, if it was unsound, it was of no value to the miller, because he could not possibly make good sound flour from it. Generally the spoilage of wheat was due to harvesting and storing wheat which contained an excess of moisture. It made little difference whether the wheat became wet after reaping, or whether, as was sometimes the case, the excess of moisture in the wheat was due to it having been reaped before it was ripe; the results were the same. Stimulated by high moisture content in the grain, the head developed and fermentation took place, with the result that the grain spoiled. At times, largely as a result of bad weather conditions at the time of harvest, there had been some spoilt grain on the market. With some such wheat there was no doubt about its being unsound, because the odor and appearance immediately warned the miller. Some lots of wheat, especially those which, although they contained an excess of moisture, had not yet reached the state of spoiling, were not so easy to detect, and millers at first had much difficulty in determining whether grain was sound or not. Also in many cases a miller was not sure of the condition of some wheat until it had been milled and the flour therefrom made into bread. Wheat should be allowed to become properly ripe before reaping. No matter what skill a miller might possess in making flour, or what class of machinery he had in his mill, he could not satisfactorily overcome the difficulties of having to grind immature or unripe wheat. Especially should wheat be allowed to become dead ripe when such grain was to be used for seeding purposes. Exposure to the sun's rays acted as a disinfectant to wheat, and the crop grown from such seed would be much less liable to smut infection. Smut was one of the worst enemies of flour with which a miller had to contend, and should be guarded against as much as possible by wheat farmers. Much could be done to prevent smut by using for seed only pickled wheat which was fully matured and dead ripe before reaping. Only from fully matured wheat which was free from smut, barley, oats, and all foreign grain or weeds, could a miller produce a flour of good baking quality. Straw and chaff, &c., should also be eliminated as much as possible before wheat was put on the market. Although not making much difference as regards weight of wheat, straw, and chaff in large quantities caused much inconvenience to millers on account of choking and blocking in the various machines used to prepare wheat for grinding. The varieties best suited for milling purposes were wheats of a light color. Dark and hard varieties could only be used in very limited quantities for mixing with wheats of a lighter color, and therefore were not liked by millers, since such wheat required careful attention. Florence wheat was one of the hard varieties. It gave a very strong flour, and was good for mixing in the proportion of about one to seven of soft wheats, but came partly under the red varieties, because it could not be used without mixing and required careful attention by millers. If a wheat was good for mixing, but not as good as a straight white wheat, it could not be recommended, even where such wheat would beat all records in standard weight per bushel. Red wheat should not be grown by Australian farmers, because European flour millers could purchase red wheat at a lower price than they would pay for white varieties. Red wheat produced a flour out of which the European bakers made a cheaper and inferior grade of bread. Consequently the Australian farmer would have to accept a lower price for his red wheat. Wheats of the same variety might produce a flour of entirely different baking quality if grown on different classes of soil. The flour of a wheat grown on limestone country was of superior baking quality. (Secretary, Mr. H. E. Wilksch.)

: GREENOCK.

January 5th.—Present: 29, members.

CROP ROTATION.—Mr. C. Werner read the following paper:—"No one more readily realises the value of a rotation of crops than the capable market gardener who practises intense culture. It is a well known fact that a farmer in this district cannot successfully grow two cereal crops in succession on the same ground. For this reason, as well as for the purpose of conserving moisture, it is necessary to fallow and crop the land only every other year. But by continually sowing the land with wheat every alternate year the ground is inclined to become wheat sick. This proves the necessity for crop rotation. A simple form of crop rotation, and one that at one time proved to be successful, was the three-year system, *e.g.*, fallow-wheat-pasture. Owing to the high price of land and the drop in sheep and wool, this method would not be profitable at the present time. A form of crop rotation that had gained popularity in recent years was bare fallow-wheat-peas-wheat; crops were successfully grown under this system in wet years; however, the wheat crop following on peas proved to be a failure in dry seasons. A more reliable system would be fallow-wheat-peas followed by fallow were it not for the grub menace. From personal experience I select oats sown on fallow as the most profitable form of rotation. Supposing we have a farm of 600 acres of arable land of which we have 300 acres under crop annually and 300 acres under fallow, I advocate sowing 50 acres with oats and 25 acres with barley each year, selecting a different plot of 75 acres for oats each year, then in a term of eight years the whole farm would have had the benefit of an oat crop. My reasons for selecting oats are that they draw different constituents from the soil than wheat, they check weeds, and minimise disease for future wheat crops, particularly take-all, to which oats are not subject. In this respect they are most valuable on Bay of Biscay ground, with a pipe clay subsoil, which is most susceptible to take-all. On my farm I had a piece of ground badly infected with this disease. As an experiment part of this was cropped with oats, with good results, and two years later sown with wheat on fallow, which yielded a clean and heavy return, free from take-all. The crop on both sides, which did not have the benefit of a preceding oat crop, was light, full of weeds, and badly affected with take-all. Many farmers who are accustomed to feeding wheaten hay only, perhaps do not realise the food value of oaten hay. Chemical analyses and digestion trials have proved that, compared with wheaten hay, it contains from 10 per cent. to 15 per cent. more digestible nutrients, in addition to this there is some principle peculiar to the oat plant which has a stimulating effect on the animal system. For dairy cattle it is particularly valuable, as it increases the milk flow. There is no other grain food as valuable as oats for horses. I would not recommend oats as a grain food for pigs—barley being more economical; but for the purpose of stimulating the secretion of milk in cows, oats are equal to bran, especially when crushed. As regards feed for sheep, oats are far superior to other cereals when paddock feed is scarce and hand feeding has to be resorted to. Chemical analyses prove that oaten straw is far superior to wheaten straw in flesh-forming constituents. Oaten cock chaff, compared with wheaten cocky chaff, reveals the same results. From experience I would recommend Algerian and New Zealand Cape as suitable varieties for this district." The following are extracts from the discussion:—"Excellent results have been obtained after pease had been grazed off by sheep and the land cropped the following season. The usual procedure in a fallow-wheat-peas-wheat rotation is to cultivate the land for the peas and to skim-plough it for the wheat crop following the peas. It is advisable to cultivate after the ploughing in order to consolidate the soil; it was pointed out that in all late fallows it was essential to cultivate to ploughing depth for the initial cultivation in order to eliminate hollows or 'air-pockets.' The superiority of oats (over other cereals) for checking weed growth was commented on, it had been most noticeable where the land was infested with fumitory. As a crop for grazing, it was recommended to sow a mixture of barley and Algerian oats. The barley provided early feed, and, with opportune rains, the oats would provide a picking right into the summer. Farmers were warned not to sow Early Burt oats for this purpose, as it would not stool well, and, once grazed off, made a very poor recovery. In any case it was not deemed advisable to grow the above-named variety in this district. A member said he had a paddock sown with oats last year, and, as the weather in June was abnormally dry, he turned his sheep into the crop. When, at the end of the month, splendid rains fell, the paddock was apparently bare; in a surprisingly short time the oats sprouted 'as thick as a brush' and eventually yielded a good return. The variety was Algerian. It was stated that barley, as a rule, was cleaner from weeds than wheat, it was contended, however, that this was due to the fact that barley was invariably sown later than wheat, when most of the weeds had germinated and were killed by the cultivator." (Secretary, Mr. H. Wiltsch.)

OWEN.

October 29th.—Present: 15 members and 20 visitors.

FIRST AID.—The following address was given by a medical practitioner:—"Let us firstly consider the most efficient articles always useful in case of accident. Valuable as the roller bandage is, my medical experience leads me to the conclusion that the triangular bandage is the more practical. This is made by cutting a piece of linen or calico 40in. square diagonally into two pieces, and by using this type, various bandages, such as the broad, narrow, and medium, may be fashioned simply by folding to the various widths; but in all types, it is necessary to first fold a hem about an inch wide at the broad end, to facilitate tying and give greater stability. Splints will probably have to be improvised on the spot, such as pieces of kerosine case, a broom handle, walking stick, or even a newspaper rolled tightly—in fact, anything that is firm enough and long enough to keep the joints immediately above and below the fractured bone at rest. Perhaps at this stage it would also be advisable to stress the value of having on hand small quantities of lint for applying immediately over the wound, prior to placing the bandage, in addition to a small roll of adhesive tape. Obviously the bandage will be used mainly for the holding of splints in position in the treatment of fractures. Fractures may be divided into three classes:—1. *Simple*: Wherein the bone is broken with but slight injury to the surrounding parts. 2. *Compound*: The bone is broken and the skin is broken or torn and in this manner, germs are able to obtain entrance to the seat of the fracture. In some instances, the fractured ends may protrude through the skin or the wound may lead down to the fracture. 3. *Complicated*: The bone is broken and there may be injury to some important blood vessel, body organs, or nerves. The general signs and symptoms of a fracture of the bone are pain near the break, loss of power in the limb, swelling about the seat of the fracture, and deformity whereby the limb assumes unnatural positions, whilst in many instances, where the bone is close to the skin (e.g., the shin bone), it may be seen or felt. In all cases of fractures, the object of first aid treatment is to guard against further injury and prevent simple fractures becoming more serious, and on no account should a patient be moved until the injured limb has been rendered as immovable as possible by splinting or other methods. Bandages must be applied firmly, but not so tightly as to restrict circulation of blood in the limb, whilst in all cases of fractures, remember to keep the patient warm, for in this manner the effects of shock are considerably reduced. As a general guide, the broad bandage should always be used in injuries to the trunk of the body, for the arm or forearm the narrow bandage, whilst in the case of the thigh or leg, the medium or narrow bandage should be used. Signs of *dislocation* are not unlike those of fracture, as with dislocations there is severe pain of a sickening character at or near the joint, the limb loses its power, the parts of the limb near the dislocation have a feeling of numbness, it is misshapen at the joint, whilst commonly there is also a fixity of the joint. The treatment of a dislocation is broadly thus:—Rest the limb in the most comfortable position, apply cold dressings to the joint, and if these do not give comfort, apply hot fomentations pending the arrival of the doctor, who alone should reduce a dislocation. *Shock*: In almost every accident, shock of a more or less severe nature is found, whilst fright, anticipation of injury, sudden bad news, or the removal of fear and anxiety after prolonged suspense in many instances produce shock or fainting. The general symptoms of shock are extreme paleness, a feeling of cold, clammy skin, and feeble pulse, whilst in collapse the temperature very often falls below normal, and the object of first aid is to prevent it from falling to that point where life is impossible. Treatment of shock is as follows:—Allow the patient to lie upon his back, with the head low, whilst the lower limbs should be raised; plenty of fresh air should be allowed to circulate, and if the temperature has fallen, cover the patient well with wrappings, together with hot water bottles, &c., at the feet. If the patient is able to swallow, hot drinks, such as milk and tea should be given, with sugar added; sugar always materially assists in raising the temperature of the body. In the case of fainting, the best method is as follows:—When the patient is in the lying position, bring the head and trunk forward until the head is almost between the knees, and thus allow the blood to once more regain circulation to the head. *Haemorrhage*: Perhaps of more interest in first aid work on accidents as may befall the man on the land is that of the application of ligatures. The organs of blood circulation are the heart, arteries, veins, and capillaries. The arteries convey the blood from the heart, veins carry it to the heart, whilst the capillaries connect the arteries and veins. Arteries may be found on either side of the windpipe running to the head, again leading under each collarbone down the arm corresponding with the seam of the coat sleeve on inside, whilst again one may be found leading down the back of abdomen, dividing in pelvis and leading through the groins to either leg. In an arterial haemorrhage blood will be found to be scarlet, and should the

artery be near the skin, the blood will be found to spurt in jets corresponding to the beats of the heart. In the case of a severed artery, it will always flow from the side nearest the heart, whereas the blood from a vein will always issue from the side furthest from the heart. Arterial haemorrhage is, when practicable, to be arrested by pressure, position of the body, and elevation of the bleeding part. Pressure may be applied upon an artery in three ways:—1. Digital: This is by the thumb close to the wound. 2. Tourniquet: Pad and bandage. 3. Flexion. The best method of staying the flow of blood is by means of the tourniquet, which is made by tying any small object in a handkerchief or bandage, placing the hardened part very carefully over the artery, and when tying the ends of the bandage on the other side of the limb, tie in a piece of stick about 6in. long. Pressure may now be obtained by means of this stick, and when sufficient pressure has been gained to stay the flow of blood, carefully lock the stick in position. Great care must be exercised in placing the pad over the seat of the artery, and once every half hour pressure should be slackened for a minute or so to allow blood to pass through the limb. In the case of haemorrhage of the vein, the blood will be found to be dark red, flowing in a slow, continuous stream, whilst it will be found to issue from the side furthest from the heart. Elevation of the wound, coupled with pressure by the thumb, will in all cases stop the flow in such a wound as this. Regarding the capillaries, the blood will be very light red, whilst it merely oozes, as after minor cuts, &c., and very slight pressure only is needed to arrest this. *The Ear*: Probably of more interest and a more common accident is that of foreign objects in the eye and insects, &c., in the ear. The ear can be terribly painful, and yet if a little warm olive oil be poured in, any insect will usually float out. Should a grass seed or oat lodge in the ear, and yet perhaps cannot be seen, a much better view of the interior of the ear channel may be gained if the lobe of the ear is pulled upwards and backwards, when usually the object may be located and removed with a very fine pair of tweezers. *The Eye*: When foreign bodies lodge in the lower lid of the eye, they always cause great pain to the patient. In all cases the patient should refrain from rubbing the eye, and if the lid is pulled downwards the object will be seen quite plainly, and in most cases the twisted corner of a handkerchief will brush out the object. Regarding those that may lodge beneath the upper lid, it will be found that these can also be easily removed if the following treatment is observed:—The upper eyelid should be pulled forward, whilst the lower is pushed up, so that the lower lid lashes brush against the inner surface of the upper one and usually dislodges the object at the first attempt. In the case of lime in the eye, a weak solution of vinegar and water will be found very beneficial. *Burns*: A few precautions should always be remembered. If a person catches on fire, for instance a woman's dress:—1. Never run outside into the open air. 2. Lie the burning person flat on the floor, so that the burning portions are uppermost, as flames will always rise, and should the person be standing flames will envelope the whole body. 3. Smother the flames with a blanket, towel, or anything handy. Should the burns be serious, remove any clothing left, except that stuck to the wounded surfaces; do not break blisters, and, if possible, exclude air from the burnt portions by keeping the wound in warm water, or apply lanoline or vaseline. In all cases of burns, after shock will be very serious, and this should be treated as previously mentioned. *Sunstroke*: If a person be not in the best of health there is always the danger of sunstroke when exposed to great heat. The beaming of the sun upon the back of the neck and head of a person will sometimes bring on a sunstroke, the symptoms being sickness, faintness, giddiness, and difficulty in breathing. The patient complains of thirst, the skin becomes dry and burning, the face becomes flushed, the pulse quickens, and the temperature rises to the abnormal until collapse ensues. For treating this the following hints will be found very beneficial:—Remove the patient to a cool, shady spot, upper clothing should be removed, the head and trunk kept well raised, and whilst one person fans the patient vigorously, another should apply cold water to the head, neck, and spine until the symptoms subside. Upon regaining consciousness, the sufferer should be allowed water to drink. *Snakebite*: In treating snakebite, the patient should bear in mind that it is absolutely necessary to keep the venom from the heart, where it will be spread through the whole body. To attain this, immediately place a ligature, if it be possible, between the wound and the heart. Keep the wound low, and encourage bleeding by cutting deeply between the fang marks. Suck the wound, thereby withdrawing the venom, and once assured all poison has been removed, sterilise the wound with Condy's crystals, &c., and remove binding."

HARVEST REPORTS.—During October members of the Branch visited Roseworthy College. An excellent report of the visit was presented by Mr. W. J. Marshman at the meeting held on January 27th. The Secretary, Mr. A. Bowyer, gave the following harvest report:—The Owen district gave varied yields, according to the sowings, early sown giving good returns, whilst late sowings were light. He attributed the marvellous manner in which the crops hung out during the late weeks of May and right through June to the heavy thunderstorm of approximately 2in. of rain the previous December. The paper revealed the fact that the Owen rainfall for the year was 1,445 points, whilst

in the growing period there were 11 in., but 3 in. of this was gauged during the last few days of October. Whilst rust was prevalent throughout the district, members in common gave reports of good samples, whilst early sowings of such wheats as Nawob, Ford, Nabawa, Gluyas, and Crostan gave yields of 27 bush. per acre, but the same wheats sown in late June and early July gave yields nearer 18 bush. In the report the writer made mention of high yields of English barley, and the report showed an exceptional year in oat crops on stubble ground of the following varieties:—Palestine, New Zealand Cape, Early Burt, and Pride of York. Mr. McPharlin also reported Nawob as being subject to disease, but yielding well, with Nabawa and Ford equally as good. Sultan and Crostan, although they showed great promise in early spring, were both affected by rust. The latter variety showed great promise as a hay wheat. In the discussion regarding oats, Mr. H. Bowyer mentioned that a great difference had been shown this season between Algerian and New Zealand Cape. The former, he asserted, were a fortnight later than New Zealand Cape, whilst they did not stand so upright as the latter. He preferred New Zealand Cape as a hay variety, because, whilst growing equal bulk, the stock relished it far more. Speaking on the sowing of oats, he favored early shallow sowing and a hard seedbed for good results. (Secretary, Mr. A. Bowyer.)

SADDLEWORTH (Average annual rainfall, 19.60 in.).

November 7th.—Present: 20 members.

Mr. F. W. Coleman gave a lecture on his visit to Western Australia.

DAIRYING.—The following paper was read by Mr. L. Giles, of the Wirrilla Branch, at a meeting held on March 6th:—"Dairying at present is a very pleasing subject to talk about, for it is the one thing left us to do that shows a reasonable profit. Until recently we have had good prices for wheat, wool, and fat lambs, and that has had the effect of inducing farmers to get rid of their cows and keep to the easier methods of making money. Now that prices for everything else have slumped, farmers are again wanting to run more cows and so get some ready money to help them over these bad times. Dairying has an advantage over other methods of gaining a livelihood on the land, in that the returns come in fortnightly. Therefore, it does not need so much capital to start on as other methods. Farmers shy clear of the cows because of the tie they are, but dairying properly carried out is perhaps the most interesting of callings. We keep records of all cows by weighing all milk and booking all weights. I will divide dairying into three parts, namely, feeding, breeding, and weeding. No person can hope to make a success of dairying if they do not supply their cows with a reasonable amount of the right sorts of feed. Always keep in mind a balanced ration, and always study economy; do not feed one sort of fodder to the cows if some other fodder equally as good at a lower figure can be obtained. A balanced ration is a certain amount of roughage or carbohydrates, concentrates, or proteins with some green fodder included, or failing that, some root crop such as mangolds or turnips. Carbohydrates can always be grown on local farms by cutting ordinary cereal hay and either feeding it as hay or chaffing it. Do not use mouldy hay, it is likely to give the cows indigestion, a complaint that good cows are very subject to if one tries to get the best out of them. It also may spoil the cream, and second-grade cream is not profitable. It is quite possible to give too much chaff, but it is not possible to get a cow to eat too much good, clean hay. There are several kinds of concentrates that can be fed, but usually crushed oats and bran in about equal quantities make the best and most economical mixture. Feed at least two kinds of concentrates—more if they can be secured without adding to the cost of feeding. Linseed meal is a splendid concentrate to feed if other concentrates are not cheap, but at present prices linseed meal is out of the question. If linseed is equal in price to double the quantity of bran or crushed oats, it is a reasonable proposition, but with bran £3 15s. per ton, oats 1s. 3d. per bush., and linseed meal £12 per ton, linseed is too dear. When using linseed, always soak it in water. Feeds of linseed must not be fed more than 2 lbs. or 3 lbs. per day. It is not possible to set a given quantity for each cow, individual cows differ in their requirements, and much depends on how much they are getting in the paddocks, but about 5 lbs. to 10 lbs. of chaff twice a day, with 2 lbs. of concentrates for every gallon of milk the cow gives, will show best results. We feed 3 lbs. of concentrates per gallon to our cows, but I would not advise that much for ordinary dairying. A sheaf of hay per day is a good help, and aids the cows to digest their feed. For a few months in the year, while the grass is at its best, we have proved that hand feeding is of very little help. With us it lasts for about two or three months, that is, of course, when dairying is the most profitable. It can only be done when the grasses are at such a stage that they are a balanced ration in themselves. To over feed a cow means that one is wasting feed and money. To under feed means that the cow has to take a bigger proportion of what she is getting to keep her alive, and so does not have enough left to make milk and butterfat. Good cows pay to feed well, because they turn what they eat into milk, but bad cows put it on their bodies in

fat, and the dairyman loses it. *Pure-bred Stock.*—What would the farmers of South Australia think of a farmer that got his seed from a neighbor that never grew more than 10bush. per acre, while he had other neighbors continually growing 30bush.? If a farmer did that he would be the laughing stock of the district. That is exactly what the dairymen are doing that are breeding from scrub bulls. All have heard the saying, "Like father, like son." Generally that is right so far as purebred stock goes, because for generations there has been the one class of stock, and there is nothing else in the blood to throw back to. That is the reason there are very few "duds" in pure-bred stock. The same does not apply to mongrels, because there is no telling how a mongrel is got, one time it will throw back to one sort of ancestor and another time to another sort. Hence the reason of so many 'duds.' Pick the breed you think most suitable, buy a pure bred bull of that breed and stick to it. It only takes a few generations to make them nearly pure. Do not forget that the bull is half the future herd, so be careful to see that his ancestors have good milk records behind them. There is no excuse to-day for anyone in South Australia using scrub bulls while the Government pays one-half the price for good, pure-bred dairy bulls. There are four breeds of cattle in South Australia recognised as dairy breeds, and I would not advise a dairyman with one of those breeds to change to another breed. The good cows of any of the breeds are better than the bad cows of another breed. Ayrshires are small and very hardy cattle, and are supposed to be able to do well under conditions that would be too hard for any other breed. Their milk contains a higher percentage of casein than any other milk, and is particularly good for making cheese. In South Australia they usually fill the fourth place as butterfat producers and are not very popular. As the casein is not taken out of the milk when separating it makes a good fodder for pigs and calves. The Jersey is the best known breed in this district. Its strong point is its high butterfat percentage in the milk, the highest of any breed of cattle. The breeders of the Jersey generally claim that they are the most economical butterfat producers. They usually fill second place in South Australia as butterfat producers. The Milking Shorthorn is the most easily fattened for beef of the four breeds. That, combined with being good milkers and next to the Jersey in butterfat production makes them a very popular breed. They are the largest milk producers, and their milk is also the most wholesome of any animal that is milked for the use of the human race. Their milk contains more sugar than that of any other cows. They are next to the Ayrshire in casein and are lowest in butterfat, which makes their milk especially good for the production of cheese and to feed after separating. They are the largest cattle of the dairy breeds, so the good beefers and are easily the best vealers of any breed of cattle. Since dairy testing started in South Australia, they have never failed to secure the top place, often by very large margins. *Weeding.*—This needs very much more attention in South Australia. It is only by testing individual cows that we can find out the best cows. The biggest milkers may be quite a long way from the best cows in the herd, so also may the cows with the highest butterfat percentage. It is only by weighing the milk and testing it that the true position of the cows in the herd can be placed. It is not much good just testing cows once, as the cow may secure a lucky test or an unlucky one. The best way to test is to weigh all milk received and to get the factory to test the milk of every cow for each milking for 24 hours about once a month. It is only by testing that a dairyman can know which cows to weed out, and it is very necessary to weed out the worst cows and to replace them with heifers from the best cows. If a dairyman is to be successful, it is important to always have first grade cream. This is a simple matter if the following few hints are observed:—See the cows are well fed on good feed and that they eat nothing to spoil the cream. Keep the separator and all utensils clean. Stir the cream regularly at least twice a day and stir well. Send the cream to the factory at least twice a week. Top-dress pastures for dairy cows; it helps the grass to get away quickly and makes a great deal more feed. The feed is also a much better quality, and keeps the cows healthy. Regular habits are very necessary for the dairyman. Milk as nearly as possible to the same times and be even more particular to feed at the same times; irregular feeding upsets cows more than irregular milking. Get as many cows as can be arranged in, in autumn or early winter, to obtain full advantage of green feed. Cows are then just in when butter is at its highest price. Never upset dairy cows by hitting or kicking them or in any way knocking them about. Get cows that are coming in shortly in good condition; poor cows cannot do themselves justice. See that vessels that the calves drink out of are kept clean and skim all froth off the milk. As soon as the calf is old enough to eat, give it chaff and crushed oats. Skim milk is usually laxative enough, but if more is needed, add bran. A small handful of pollard stirred in the milk is a help, but do not put enough to stop the calf from drinking. If the cows have sore teats, Animol ointment is best. Always keep a drench of some sort on hand. Last, but by no means least, is the question of water. Always try to run cows where they can get plenty of good, clean water to drink. A cow that is milking heavily will drink four or five times a day." (Secretary, Mr. A. Blundell.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Penwortham	5/3/31	11	Discussion	A. Jenner
Blyth	27/2/31	20	Harvest Reports	L. Mugge
Blyth	13/3/31	—	Address—Messrs. H. B. Barlow and F. C. Richards	L. Mugge
Black Springs	3/3/31	7	Formal	K. Dunn
Everard East	14/2/31	8	Harvest Reports	F. Hughes, Blyth
Buchanan ..	4/3/31	14	Address—"Cost of Wheat Production," Mr. F. Coleman	L. Bell, Marrabel
Brownlow ..	19/2/31	15	Special Meeting <i>re</i> Land Tax	T. Partridge
Brownlow ..	4/3/31	14	Annual Meeting	T. Partridge
Brinkworth ..	9/3/31	16	Address—"Veterinary Surgery," Mr. Alderson	H. Ottens
Greenock ...	9/3/31	31	Paper—"Soil Cultivation," Mr. T. Roenfeldt	H. Wilksch
Wasleys	12/3/31	19	Harvest Reports	C. Currie
Wasleys	9/4/31	18	Conference Report	C. Currie
Buchanan ..	27/3/31	8	Paper—"Sheep," Mr. D. Campbell	L. Bell, Marrabel
Hoyleton ...	30/3/31	13	Address—"Fat Lambs for Export," Mr. W. Newman	W. Chapman
Owen	31/3/31	8	Lower North Conference Reports	A. Bowyer
Brownlow ..	1/4/31	14	Harvest Reports and Report of Visit to Roseworthy College	T. Partridge
Lyndoch	31/3/31	12	Discussion	J. Hammatt, Williams-town
Everard East	11/3/31	9	Discussion	F. Hughes, Blyth
Greenock ...	14/4/31	22	Seasonal Reports, by Messrs. B. Brannock and R. Radford	H. Wilksch
Light's Pass.	27/4/31	17	Discussion	C. Verrall
Hoyleton ...	6/10/30	13	Congress Report	W. J. Chapman
Brownlow ..	6/10/30	17 and 2 visitors	Address—"Wheat Varieties," Mr. W. C. Johnstone	T. Partridge
Penwortham	27/10/30	7	Congress Reports	A. Jenner
Buchanan ..	27/10/30	27	Address—"Cattle Breeding," Mr. C. Ivy	L. Bell, Marrabel
Buchanan ..	25/11/30	12	Formal	L. Bell, Marrabel
Penwortham	3/12/30	15	Address—"Poultry," Mr. C. F. Anderson	A. Jenner
Greenock ...	13/10/30	43	Papers—"Tractor v. Horses," Messrs. E. Nitschke and B. Braunack	H. Wilksch
Greenock ...	10/11/30	35	Paper—"The Value of Lime," Mr. E. Radford	H. Wilksch
Greenock ...	15/12/30	36	Paper—"Trip to the Eastern States," Mr. Jarret	H. Wilksch
Penwortham	8/1/31	7	Lower North Conference Report	A. Jenner
Buchanan ..	2/2/31	14	Harvest Reports	L. Bell, Marrabel
Truro	9/2/31	19	Harvest Reports	L. Davis
Greenock ...	9/2/31	34	Address—"Winemaking," Mr. W. Dempster	H. Wilksch
Snowtown ..	12/2/31	8	Question Box	A. Hocking

Summary of Meetings, &c.—continued.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Rosedale ...	3/2/31	14	Annual Meeting	H. Muegge, Sandy Creek
Black Springs	3/2/31	8	Harvest Reports	K. Dunn
Wasleys	12/2/31	24	Congress Reports	C. Currie
Nantawarra.	4/12/30	9	Paper—"Rainfall, 1907-25," Mr. W. Hamdorf ;	N. Robinson
			Congress Reports	
Nantawarra.	29/1/31	10	Paper—"The Wool Industry."	N. Robinson
Clare	3/2/31	16 and 15 visitors	Addressees—Messrs. W. J. Spafford and R. C. Scott (Department of Agriculture)	A. Ninnes
Hoyleton ...	9/2/31	16	"Harvest Reports," by Messrs. L. Scholz and H. Baum	W. Chapman
Owen	23/2/31	17 and 5 visitors	Address—"The Dairy Act," Mr. H. B. Barlow	A. Bowyer
Snowtown ..	3/3/31	14 and 12 visitors	Address—"Poultry," Mr. C. F. Anderson	A. Hocking

YORKE PENINSULA DISTRICT.**(TO BUTE.)****BOOR'S PLAINS.**

January 8th.—Present : 20 members.

POULTRY.—Mr. F. Day read the following paper :—For the last few years poultry farming has made such rapid strides, and is occupying our minds to such a marked degree, that the industry is frequently referred to as being the only one at the present time that is paying its way. The British markets are now beyond the experimental stage, and offer a good steady demand for our produce. To make poultry farming a success, one must have a certain liking for the birds, and must be observant, especially where there are large flocks kept, and large numbers running together, as any birds which are off color are easily overlooked, and it may be the cause of sickness going through the whole flock. The poultryman's success depends on his knowledge, methods, and the birds he keeps. The actual amount of knowledge that is required is not very great, but it is surprising how easy it is to go wrong, resulting in loss of time and money, such results being put down to the poultryman's bad luck, which, to a very small degree, it might be, but generally it is through lack of knowledge. As a rule the so-called lucky ones leave nothing to chance, therefore when wishing to build up a big plant, my advice is "hasten slowly." One way to make a start is to purchase day-old chicks, and rear them to maturity, thereby gaining valuable experience, or by purchasing a pen of breeders and hatching them under broodies or in an incubator. Another way is by buying eggs, but no matter which way you start, always get the best stock or eggs that you can afford, and always go to a reliable breeder, even if you have to pay more ; but remember you are building up a new industry, and what good will up-to-date sheds, plant, and balanced food rations be, if the stock are not bred for egg production or table purposes. I do not propose to deal with the working of the incubator, as there are so many factors which influence the results, that it would be useless and too lengthy to discuss it at the present moment. *Care of the Chick from the Incubator.*—Care must be taken that the chick is not chilled during removal from the incubator to the brooder, which should have been previously heated to the correct temperature, 95 degrees for the first week, and gradually reducing it week by week, until they are five or six weeks old. Some breeders take them away at two weeks old, and put them into cold brooders, certainly a saving of time and expense, but those methods are more applicable where there is plenty of help. I have used the cold brooder at that age, but prefer the heated brooder for the longer period. The feeding I adopt for the first few weeks is comprised of one part pollard, half bran, 10 per cent. buttermilk, with charcoal broken very fine. After two weeks old I add one heaped teaspoonful of sterilized mineral bone with iodine. This feed is in the form of dry mash, and is always before them. I do not give any wet mash. From a fortnight old, fine grain is sparingly fed at night for the first five or six days, and then gradually increased in quantity and coarseness. If grain is fed lavishly at first, it is liable to bring on diarrhoea. If there should be an outbreak of diarrhoea, increase the quantity of buttermilk powder by 5 to 10 per cent., but the quantity in the formula should

keep it in check. At this age, green feed should be fed, as much as they can eat. Regarding brooders, I prefer the blue flame, with the canopy or hover type. A brooder with a hover 5ft. in diameter will be large enough to accommodate 500 chicks for the whole of the period that they require the brooder. As a rule the brooder for 200 chicks, or any other size, is only large enough for one week. I believe in starting the other end, and having the house large enough for the family when they grow up. If rearing for egg production only, it is advisable to kill off the cockerels the moment they show their sex. They do not pay to rear, and they cost as much as pullets to feed. We will assume that you have reared the stock approaching roosting. This is a trying time, and various methods are used to get them to roost. A good method is to arrange perches about 12in. from the ground, being of 3in. by 1in. hardwood, and placed about 6in. apart. At roosting time the chickens roost for a short time before starting to crowd, but before allowing them to get to that stage I place empty sacks over those that are on the perches, and catch the balance and place them under sacks also. Leave these sacks on until it is dark, and they are then taken off, and the chickens stay on the perch without any trouble. I do this for about a week, and then place perches higher and wider apart, and then have practically no further trouble, except to keep an eye on them to see they do not crowd or roost on each other. By this time all the cockerels should have been separated from the pullets. Still continue with the dry mash and plenty of green feed. I use the following ration:—Bran, half part by measure; lucerne meal, 5 per cent.; pollard, two parts; meat meal, 5 per cent. of the weight of the above; charcoal, 5 per cent. by weight; salt, 20 per cent. by weight. If for fattening purposes, a mixture of bran and pollard, barley meal, maize meal, mixed with skim or separated milk, and 5 per cent. brown sugar, and their liberty curtailed, is recommended. I favor the intensive system; it certainly means extra expense for suitable yards, but the expense more than pays for itself before very long. Some prefer the semi-intensive, but objection to that is the confinement of the birds at various periods, and at such times the birds will frequently fret on account of the confinement, and go off laying. The aim of the poultry farmer, or anyone who keeps fowls, is to keep the best they can possibly afford, and, of course, breed from hens of high egg production. Selection of laying and breeding stock is an art, and is only acquired by experience, and should be learnt as soon as possible. This is the secret of successful poultry farming. A farmer may have 1,000 fowls, which are unprofitable, but if the fowls are severely culled, it is more than likely that his loss will be turned into a profit. Learn to pick the workers. Houses for the intensive system should be about 8ft. high in front and 6ft. high at the back, with a cement floor for preference. In some cases the front is enclosed for about 3ft. high, and others to within 1ft. of the top. I prefer having only from 1ft. to 2ft. of the bottom filled in, to get the full benefit of the sun. The floor should be covered with old straw, and do not at any time use any material that is, or has been, at any time mouldy or musty. I have been using red sand, and find it very good, but on a farm, straw and other such like materials are easily obtainable. If wet mash is fed, feed early and regularly; early feeding is conducive to increased laying. Be sure to keep the troughs clean, and do not give more than they can clean up in about 20 minutes, and if there should be any left over, go around and clean it all up, and do not leave it lying about to go sour. Be sure there is an ample supply of good, clean, fresh water, and in the hot weather see that it is kept in a cool spot. In general outline, the heavy producer is wedge shaped, with the body widening out to the rear, which has breadth and depth, and has a broad back and well-developed chest, the broader and flatter the back the better, and she presents the appearance of being neat and trim, and the whole time she is active and searching for food, usually at the end of the laying period the heavy layer looks very shabby and unkempt. A fairly long, straight breast bone; a breast bone curving up at the rear is not good. The legs should be fairly long and wide apart, and should have long, fine, and supple pelvis bones. The greatest care should be exercised in choosing the male bird, for his blood will run through the whole flock; but if there is only one hen not up to standard, only her chicks are likely to be affected. This point must not be overlooked, and shows how important it is to choose only first-class males. If possible, the male should come from single-tested stock, whose mother, during her pullet year, should have laid a minimum of 220 eggs, weighing 20zs. Never use a bird that is not masculine in appearance and virile, and the bird that has fight in him, and objects to anyone touching the hens, is much desired. Discard all birds for breeding purposes with wry tails or twisted breast bones, narrow backs, and flat chests. The eyes of the male should be bold and outstanding, with long and somewhat narrow head. Do not use a bird with an over-heavy comb, and the comb and gills should be fine and smooth to the touch; an over-heavy comb indicates coarseness. The breast bone should be as long and as straight as possible, and discard one with a hook up at the back. Do not breed from undersized males. A very annoying feature is lack of fertility, and if proper conditions exist, fertility is then a matter of attention to details. An over-fat male or female will cause poor results. Infertility in females is usually caused by over fatness, often caused from under exercise, and too great a portion of starchy foods in relation to the protein matter. There is a great diversity of opinion regarding the results of feeding wet or dry mash. The one big feature in feeding dry mash is the saving of time; consequently, one man can look after a greater number of birds, and, by having large hoppers holding many days' supply. My hopper holds three bags and lasts three weeks for 150 birds. The wet mash advocates claim they get more eggs from their method; but as fewer birds can be attended than is the case with the dry mash, I consider the advantage is with the dry mash feeding. (Secretary, Mr. S. Chynoweth.)

PASKEVILLE (Average annual rainfall, 15.64in.).

March 3rd.—Present: 17 members.

LIVESTOCK FOOD VALUES.—Mr. L. Moat read the following paper:—"All animal food-stuffs contain certain digestible nutrients, each serving a definite purpose. By far the most important of these are albuminoids. Albuminoids are composed of carbon, hydrogen, oxygen, and nitrogen; they closely resemble the albumen or white of an egg. Bone and muscle, as well as milk, consist largely of this substance. If an animal's body is thoroughly dried, albuminoids will constitute about one-third of the weight. Growth as well as wear and tear can only be supplied by albuminoids. The next most important of the constituents are carbohydrates. These consist chiefly of sugar and starch. They contain carbon hydrogen and oxygen, but not nitrogen. The carbohydrates in the process of digestion are oxidised in the tissues, and the heat is given off. Thus they supply energy and maintain bodily heat. The other constituents are of less importance. Fats are practicably interchangeable with carbohydrates, 1lb. of fats producing 2½ times as much heat and energy as sugar or starch. The mineral substances need occupy little attention, as they are usually present in sufficient quantities. Many careful experiments have been carried out with the object of discovering the exact ratio of albuminoids to carbohydrates and fats that are required by various animals. Naturally, the young growing animal requires a greater proportion of albuminoids than the aged beast. The youngster is building up muscle and bone, and nitrogenous materials are essential. The calf of six months, therefore, will require a ration with an albuminoid ratio of 1 to 5, whereas a two-year-old beast will do on 1 to 8. The young pig requires a ration rich in albuminoids in the proportion of 1 to 4. *Pasture.*—A knowledge of the approximate value of the more commonly used fodders is important. The feeding value of pasture grass varies greatly. Good pasture is an excellently balanced ration, the proportion of albuminoids to carbohydrates being about 1 to 6. While the plant is vigorous and healthy, the ratio is higher. As the year advances, however, the nutriment becomes concentrated in the seed. After the seed falls, the value of the pasture rapidly declines. The nature of the grasses of the same species varies greatly in different localities. Stock will fatten in one locality and lose condition in another upon grass apparently about equal. An experienced man can best judge the value of a pasture by the condition of the stock. Much can be done by manuring the pasture to increase the richness; no concentrated food is required to balance a good pasture ration. *Straw.*—The feeding value of straw by itself is very slight. This is particularly so in the case of wheat straw. The available albuminoids in wheat straw are as low as 4 per cent., as against 36 per cent. carbohydrates. It is estimated that a horse will consume as much energy in chewing and digesting wheat straw as he will derive from the fodder. Barley straw is higher with 8 per cent. albuminoids and oat straw, is considerably more nutritious; it contains 1.2 albuminoids as against 38.6 per cent. carbohydrates. *Hay.*—Hay varies in its feeding value, perhaps more than any other fodder. Australian hay made from wheat and oat crops is slightly less nutritious than the best meadow hay of England. But the cost of gathering is so much less, that it constitutes a wonderfully cheap and valuable fodder. As the crop advances, the albuminoids are concentrated in the seed, and while the proportion may not show a decline, the actual feeding value is lessened by the straw becoming less easily digested as the plant matures. If the crop be harvested before the grain sets, the feeding value will be better distributed throughout the straw, and though the loss of weight will be slightly greater, the actual feeding value will be higher. The richness of hay varies with its length, the shorter being the richer. Nevertheless, it is doubtful if it is wise to harvest the shorter crop for hay. It will generally be found wiser to cut the higher crop and add slightly more corn. Varieties such as Huguenot are of high feeding value. Oaten hay should show 4.5 per cent. albuminoids to 45 per cent. of carbohydrates and fats, while wheaten hay shows 3.75 per cent. to 48 per cent., i.e., roughly a ratio for oaten hay of 1:10 and for wheaten hay 1:13. Lucerne hay is rich in albuminoids, the analysis showing 12.3 per cent. to 40, or almost 1:3; silage shows 2.2 per cent. to 20. *Roots.*—These crops contain a very high proportion of water, and the relative proportion of nutritive matter is, therefore, low in proportion to weight. Turnips contain about one of albuminoids to seven of carbohydrates; swedes are slightly richer. Mangels are about the same, but improve when stacked. The feeding value of potatoes is about double that of turnips. *Balanced Ration.*—It will be seen, then, that good growing pastures of green fodders are, in themselves, a balanced ration. Except when a cow is milking very heavily, or in the case of a very young animal, if a plentiful supply of good grass or green food is obtainable, nothing more is required. Lucerne is particularly high in albuminoids, and a better value from the food will be obtained if it is mixed with a ration of hay or poorer pasture. Sorghums and maize, on the other hand, are relatively poor in albuminoids, and to obtain best results a small allowance of concentrated food should be given. Seeing that it is almost always the albuminoids in a ration that require building up, it is well to remember that a working horse and a fattening beast of two years each require about 2½lbs. of this constituent per day. A sheep to fatten will require approximately 1½lb., a five months old pig will

require 1½lb. Obviously an unbalanced ration means waste. Albuminoids are usually relatively expensive, therefore it is extravagance to supply more than the requirement. On the other hand, if 12lbs. of carbohydrates are required for a two years beast, and 20lbs. are supplied, the beast will gain practically nothing if the albuminoid ratio is deficient. Oats, bran, and pollard are well-balanced rations, and may be added when both carbohydrates and albuminoids are required. Barley and maize are strong in carbohydrates and relatively weak in albuminoids. Molasses practically contain no albuminoids, but about 70 per cent. carbohydrates. Podding plants are rich in albuminoids; beans carry 25 per cent. and peas 20 per cent. Both lucerne and hay lucerne (growing) are also rich in this respect. If a general shortage has to be made up, it can best be done with oats, pollard, and bran. Use concentrated foods only for the purposes of adjusting the balance. They are most useful for this purpose, but it is easy to handle them extravagantly." (Secretary, Mr. J. Prouse.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
South Kil-kerran	3/3/31	13	Presentation of Barley Competition Prizes	H. Schrapel
Boors Plains	5/2/31	12	Harvest Reports, Mr. S. Adams	S. Chynoweth
Boors Plains	11/2/31	—	Address—"Poultry," Mr. C. F. Anderson	S. Chynoweth
Boors Plains	5/3/31	21	Address—"Stock Ailments," Mr. E. Hammill	S. Chynoweth
Kilkerran ..	3/3/31	10	Harvest Reports	A. S. Dutschke, Maitland
Paskeville ..	31/3/31	13	Paper—"Seeding Preparations," Mr. R. Bussenchutt	J. Pontifex
Petersville ..	31/3/31	7	Question Box	A. G. Dutschke, Ardrossan
Weavers ...	31/3/31	10 and 70 visitors	Visit to Butter Factory, addresses by Messrs. A. J. Cooke and H. B. Barlow	H. Cornish, Stansbury
Weavers ...	13/4/31	9	Question Box	H. Cornish, Stansbury
Arthurton ..	9/3/31	14 and 42 visitors	Paper—"Dairying," Mr. T. Hicks, and address, Mr. H. B. Barlow	T. Howlett, Moonta
Boor's Plains	9/10/30	20	Crop Inspection	S. Chynoweth
Boor's Plains	6/11/30	19	Paper—"Handling the Hay Harvest," Mr. F. Benson	S. Chynoweth
Boor's Plains	4/12/30	22	Paper—"Handling the Wheat Harvest," Mr. W. Allen	S. Chynoweth
Kilkerran ..	12/2/31	12	Address—Mr. R. Hill (Dist. Agric. Instr.)	A. S. Dutschke, Maitland
Weavers ...	9/2/31	13	Harvest Reports by Messrs. L. Slade and H. Cornish	H. Cornish, Stansbury
Brentwood .	12/2/31	9	Harvest Reports*	G. Tucker
Upper Wake-field	26/2/31	14	Annual Meeting. Address—"Cultivation," Mr. J. Hartnett	C. Neumann

WESTERN DISTRICT.

COLLIE.

November 5th.—Present: Eight Members.

MACHINE *versus* BLADE SHEARING.—A paper on this subject was read by Mr. E. Olsen. "Blade shearing is the cheaper method. Having 900 sheep shorn by contract with machines and shearers would cost £22 10s. for shearing, £5 10s. for shed hands, and 10s. for fuel and oil—a total of £28 10s. After taking out 30s. for shearers' food, the cost is £27. If any stand is faulty, one has to pay the shearer at the rate equal to the sheep he would have shorn during his enforced idleness. In the case of

a broken stand, one is faced with the double cost of the repairs plus the shearer's wages. In the case of shearing 900 sheep with three blade shearers averaging 75 sheep a day, costs would be £18 for shearing and £2 10s. for shearers' food, equals £20 10s. Two men can look after the requirements of three blade shearers in the shed, but five men would be needed to look after three machine shearers, and thus another burden would be laid on the housewife. Machines injure the sheep much more than the blades. When the feed is scarce sheep do not pick up condition easily if they have been roughly treated. The machined fleece is usually torn up the back, and rough and ready handling makes it difficult to pick and throw in order to skirt it properly." (Secretary, Mr. D. Gunn, Mount Cooper.)

GOODE (Average annual rainfall, 10.20in.).

Meeting held November 5th. Present: 19 members and five visitors. Captain A. Browne read a paper, "Insurance Against Drought," and the Secretary announced the results of the local Crop Competition, Mr. J. Paech being the winner, with Mr. J. Cooper second. (Secretary, Mr. E. Fear.)

KAPINNIE.

July 25th.—Present 15 members.

FALLOWING.—The following paper was presented by Mr. B. Rogers:—"Choose a paddock which has carried a rotation of crops or a field which has not been cultivated for a few years, but used for grazing purposes, because if land is cropped successively for a number of years, it becomes wheat sick. Fallowing should begin immediately after seeding and be finished before grass and weeds have gone to seed. After the first ploughing, the land can be left for a week or so and then harrowed to kill any weeds which the plough has missed. If more weeds show, or a crust is formed on the surface, a rigid tine is better; it tends to shake the soil from the roots. It also proves satisfactory in red clay; it shakes the finer soil to the bottom and brings the clods to the top, thereby preventing the surface from running together in wet weather. If fallow is worked throughout the period when weeds are showing, it may be left alone until summer and then worked lightly after rain. It can then be left until seeding. In a district with a comparatively light rainfall more emphasis should be laid on the destruction of weeds and the aeration of the soil rather than on the conservation of moisture."

SHEARING.—Mr. C. Lukraft read the following paper at the meeting held on August 22nd, which was attended by 11 members. Shearing should be done as soon as the green feed gets a good start and the weather begins to warm up; then the sheep get the full benefit of the feed and they will be in good condition to carry them through the drier months. Grating is an important item in the shed equipment, especially for yarding sheep overnight. Another grating should be laid down for 50 to 100 sheep per shearer. A turning-out pen should be made for the shorn sheep; this will save the shearer a lot of work and time when the pen cuts out half way through a run. The shearing board should be at least 7ft. wide and situated where there is plenty of light and little draught. A serviceable wool table should be procured, so that pieces and second cuts that are gathered with the fleece can fall through. Box presses will prevent the wool from getting mixed and help the shed hand to keep up the work. Bales should be branded with stencil plates. It does not pay the small sheepowner to make too many classes. The main object is to keep the stained pieces from the clean fleece wool. It is better to have clean wool with stained pieces than stained pieces in the clean wool. The bellies should be separated and any broken or faulty fleeces classed out. If there is not enough to make a bale full they should be torn up and put with the pieces. A good watch should be kept for lice while shearing. If the sheep rub very much or the wool tends to fall out and is of a dry, discolored, and lifeless appearance, the sheep should be dipped soon after shearing." During the discussion which followed, Mr. Wagner said three or four box presses were unnecessary unless the shed was large enough to warrant them. The writer, in reply to questions, preferred blades to machines if the shearers were not competent, and also that sheep should be dipped six weeks after shearing unless lice were very bad. (Secretary, Mr. E. Wannon, Brimpton Lake.)

KELLY (Average annual rainfall, 11.92in.).

August 16th.—Present: 21 members and six visitors.

MARKETING FARM PRODUCTS.—The meeting was held at the residence of Mr. J. Beinke. In the course of an address on the above subject, Mr. Freeth said that, in the future, they would have to depend to a large extent on by-products, because of the lowered price of wheat and wool. To secure the maximum returns, it would be necessary to improve the quality of produce and have an organised marketing system. At

present they were practically dependent on stores to take their eggs and butter. Eggs, said Mr. Freeth, could be improved in quality. Only a very small per cent. of country eggs were of first quality, and he was of the opinion that consumers would be quite prepared to pay considerably more for a guaranteed article, which was borne out by the high prices obtained for Red Comb eggs. Mr. Freeth suggested that an organised system of collecting and sale would be a great advantage in the disposal of such lines as butter, eggs, sheep and other skins, tallow, &c. Supper was provided by the ladies. (Secretary, Mr. M. Martin, Kimba.)

February 2nd.—Present: 12 members and six visitors.

PASTURE IMPROVEMENT.—Mr. Martin read the following paper:—"In introducing this subject, I have in mind the low price of cereals, which have hitherto been our main source of income. Under present prices, it seems that if we carry on with it, it will be our biggest expense. In selecting other means of livelihood, stock raising suggests itself. In order to make this a success, it is necessary to have an adequate supply of fodder, either in the form of a cereal hay or grass. I shall deal mainly with grass fodder. As a district ours is not an ideal pasture country, as we have no good pasture grasses; the chief native grasses are barley, spear, and a perennial bunch grass common to our natural plains. Barley grass, although a fairly hardy and vigorous grower, is not good pasture. Stock do reasonably well on it, till it starts to make ear; it then becomes unpalatable, and stock lose condition rapidly if forced to eat it. The seeds when ripe are a danger to sheep, getting in their eyes, causing blindness, unless they are given almost daily attention till the seeds have all been shed. They also collect in the mouths of horses, causing trouble. This plant also acts as a host plant for take-all, and is particularly undesirable in a wheat district such as this. Spear grass does not occur to any great extent, except following a burn, so can hardly be classed as a dependable pasture. The perennial grass of the plains is also of little account, although it will yield a fair growth of feed under favorable conditions and grow rapidly after an early rain. There are not many grasses or pasture plants that lend themselves to our local conditions. Those I have in mind as most suitable are lucerne, Wimmera rye King Island melilot, and evening primrose. Lucerne is considered the world's best fodder, both in yield and food value. Although it yields best under irrigation, recent

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experiments have proved it to be a drought resister as well. It will grow rapidly when the first autumn rains fall, when all other feeds are dormant. It will also provide green feed throughout summer, making particularly good growth if any summer rains fall. We have a two-acre plot sown in 1927, and it has lived through the drought for six months and had a continuous stream of drift sand going over it. The best time to seed is autumn, sowing 4lbs. to 5lbs. of seed mixed with 100lbs. of super to the acre. When it has been established 12 months it should be cultivated with a spring-tooth cultivator with worn out and very narrow shares. A combine is best suited for this, and some super can be drilled in at the same time. When once established, lucerne will last many years, and if not too thick, wheat can be planted in the same field. Being a nitrogenous plant it will be of distinct advantage to the growth of wheat. Care should be used when grazing stock on lucerne, not to turn animals on it empty, or they are likely to blow on it, also continuous feeding of it is fatal to the plant. Wimmera rye grass is a splendid fodder, hardy, and will grow under any conditions that barley grass will, and there is no period of growth that stock will not eat or do well on it. The best way to establish it is to mix it with seed wheat at the rate of 6lbs. to the acre. This amount will not greatly affect the wheat yield, and will make a good seeding for leaving out the following year. King Island melilot is a vigorous growing, upright legume resembling lucerne, but it is an annual, and although liking favorable conditions, will do very well on sandy soils. Its seed will lie in the ground for years, thus guarding against seasons that are not favorable for good growth and seeding. Evening primrose will withstand droughty conditions, and will yield a lot of summer green feed when most other food is dry. Though not a plant of high food value, it is very good for stock when mixed with dry foods. This plant is used extensively in the lake districts, to check drifting sandhills; it seems to do best in soils of that nature." (Secretary, Mr. H. Martin, Kimba.)

#### KYANCUTTA.

September 2nd.—Present: 19 members.

**SELECTION OF SEED WHEAT.**—The following paper was contributed by Mr. F. Daniels:—In selecting seed for the next crop, thought must first be given to the class of land that it is intended to crop. Land can be divided into three classes, new ground, stubble or grass land, and fallow. For new ground, select wheats that will grow fairly high, so that it will be above the small sticks that are often found in the first crop on scrub land. These wheats should be of a flaggy nature to give a good burn from the stubble. Late Gluyas and J4 are the two best wheats for new ground. These, if sown about the first or second week in April with 50lbs. of graded and dry pickled seed and the same quantity of high grade super per acre in a normal year, will give a good return. For stubble on grass land, select wheats that will grow quickly, so that they can get away from grass and weeds. The two best wheats for this land are Golden Drop and Canberra. The same rate of seeding as for new land is recommended for stubble and grass land. The two varieties I would select for fallow are Late Gluyas and Nabawa. These two wheats, under favorable conditions, will yield a splendid harvest. They do not grow so rank as some of the other wheats, and they are not so likely to go down if rough weather is experienced. If the ground has been worked well, sow 60lbs. of graded and dry pickled seed with 90lbs. of high grade super per acre, but if the ground has not had proper cultivation, do not sow more than 50lbs. of seed with 90lbs. of super. All seed should be graded; 50lbs. of graded is equal to 60lbs. that have not been graded, and one will always have clean seed, free from barley and other foreign matter. Dry pickling is recommended because it saves a lot of labor during the busy time. Grading and pickling can be done in the one job; one man can put through about 50 bags per day, and this can be done any time before seeding. After four years' trial I am convinced that dry pickle is from 15 per cent. to 20 per cent. better than any of the wet pickles.

**SHEEP ON THE FARM.**—Mr. C. Kammerman read the following paper:—"With wheat at its present low price, it is essential for every farm to have some sideline. Sheep are the most profitable sideline, in fact, no farm is complete without them. For the average farm, ewes and lamb raising pay the best, even though they take up more time and attention than dry sheep. Regarding lamb raising, there are three courses open to the prospective breeder, namely:—(1) To yard the ewes for two nights a week for a fortnight, admitting rams; (2) to mate ewes the usual way by admitting rams at mating time about January; (3) to let the rams run with the ewes all the year round. The latter course for the beginner has its merits. The writer prefers the first course. The sheepbreeder, having all his ewes lambing within a few days of each other, can give them much better attention than if ewes are lambing over a number of weeks, get a much higher percentage of lambs, and there is less mortality among the ewes. In conclusion the writer's advice is get sheep on the farm, but do not overstock." (Secretary, Mr. D. Fitzgerald.)



## LAURA BAY.

November 11th.—Present: 14 members.

FARM POULTRY.—Mr. C. Collins read the following paper:—"Every farmer keeps fowls, and generally has trouble with them during the long dry summer. With a little care, much loss can be saved. Clean, fresh water should be given. The greater the variety of food the better. Give green feed regularly if possible; not a lot at one time; this may do harm if the fowls have been on dry food for a month or two. Screenings or crushed grain fed in flat tins help the chickens. Give a fair amount of wet pollard. Feed as much as possible on firm ground. Soft damp ground is good for a scratching place. Break up fresh bones and give shell grit. Roup is the worst disease and the best remedy is cleanliness. Do not allow half-grown chickens to roost on the ground. Get them up on the roost, which, although it should not be closed in, ought to be well sheltered. Good shelter and shade are needed during the daytime. Breed from matured stock and get a good rooster when possible. Black Orpingtons are good setters. White Leghorns and Minorcas are the best layers. Have a few coops, so that the setting hen can be kept to itself. Select large eggs for setting. For marketing, gather the eggs as often as possible and keep in a cool place. Have a pen to keep young roosters in. Old hens should be culled out, and any with crinkled combs or rough scaly legs or spurs should be sold or killed. For tick and lice, old car oil and kerosene mixed is recommended to be sprayed on the roost. Olive oil smeared on the body is useful. When eggs are cheap, preserve them, also boil some hard and feed to young chickens. I do not recommend incubators for farm use. To keep other kinds of poultry needs much attention. Turkeys do best with a large run and allowed to set anywhere, but are likely to meet trouble with foxes. Ducks are fast growing and profitable." (Secretary, Mr. W. Edson, Ceduna.)

## PINBONG.

December 6th.—Present: nine members.

FENCING.—Reading a paper on this subject, Mr. C. Scholz said very often fences on the farm were badly neglected. For posts, he suggested titree, and if these were not available, either kong mallee, black oak, or pine. If blackoak posts were used, they should be barked before being put into the ground. He favored a fence 3ft. 10in. high, with posts 16 yards apart, and one iron post between, and one wooden dropper between the iron post and the wooden post. With two barbs and four plain wires of 12½ high tensile wire, one would have a strong fence that would keep all stock within bounds. A meeting was also held on November 8th, there being present 10 members. The subject, "Boys for Farm Work," was discussed. (Secretary, Mr. C. Scholz, Yaninee.)

## YADNARIE (Average annual rainfall, 14.09in.).

March 3rd.—Present: Six members.

PREPARATIONS FOR DRY SEASONS.—Mr. E. Spriggs read the following paper:—"The majority of farmers in this district only receive a good hay cut once in about every four years, hence ample provision should be made for reserve fodder supplies. Sufficient hay should be cut to tide over at least a period of two years. A most important point in the conservation of the hay is the erecting of weatherproof stacks. The centre of the stack should be kept well above the walls, so that an allowance is made for the sheaves settling down. Each sheaf should be so placed with the round side downwards, care being taken to see that it overlaps the twine of the sheaf upon which it is laid. There is no doubt that the harvester and reaper thresher are great labor-saving machines, but it is a good plan to reap portion of the crop with a stripper, so that a supply of cocky chaff can be conserved. If a good stubble paddock is available, bind some of the straw for covering the chaff. Care should be taken not to overstock, and every farmer should dispose of all surplus horses, cattle, and sheep. (Secretary, Mr. E. Spriggs.)

## YEELANNA (Average annual rainfall, 16.03in.).

November, 1930, meeting.

POULTRY ON THE FARM.—Mr. J. Payne read the following paper:—"All farming is essentially mixed farming, and mixed farming in Australia, for the most part, consists of wheat, with sheep and wool in second part. The last two years, however, have been years of declining wheat and wool prices, and this, coupled with high costs of production, has been a severe blow to those who depend solely on our staple products for their income. The progressive farmer is now arduously searching for some means by which to augment his rapidly declining income. *Choice of Birds.*—A branch of the farm which does not receive the attention which it deserves is the poultry run. The first procedure is to choose birds which are to form the nucleus about which the ultimate flock



is to grow. The following questions should be considered:—1. What do I require: egg-producers or a general utility fowl? 2. How many breeds can I keep? 3. What capital can I spend on the project? I consider two breeds quite sufficient. If two breeds are chosen, I recommend Black Orpingtons and either White Leghorns or Rhode Island Reds. If, however, one breed only is chosen, I favor Black Orpingtons. This breed is one which combines flesh with egg production, is hardy, and an ideal farm bird. Having decided on the breed, try and get someone with a knowledge of poultry to choose them for you. A number, say six, good second-year hens and a 12-months cockerel should give a satisfactory start. These seven birds would cost from five to seven guineas. Do not buy inferior birds. Although a farmer will often pay big prices for stud sheep or choice seed wheat, he begrudges two or three guineas for a good cockerel. *Housing*.—The initial purchase would comprise a breeding pen, and if a breeding pen is erected it should be sufficient for the first year. The house should face north-east. It should be 6ft. high in front, sloping to 5ft. high behind. The back and two sides should be fully enclosed and a windbreak of 2ft. 6in. erected in front, the remaining 3ft. 6in. in front to be enclosed with wire netting. A house 10ft. x 6ft. should be ample. The birds should be shut in this each night and not let out next day if it is at all damp. Two flock yards will be necessary: one for mature hens, one for pullets. This house should be built on the same lines as the breeding pen, and should allow for three square feet of space for each bird. The houses may be built side by side, then the run can be arranged that the birds use it on consecutive days, or it may be divided. On no occasion should the male birds be allowed to run with the laying flock. With such societies as the Red Comb Association in being, it is possible to secure an extra 2d. a dozen for guaranteed infertile eggs. This is wonderful pay for a little care. Ventilation of houses calls for special attention. The vents should be so arranged that the air current strikes the roof first and is then deflected on to the fowls. I was recommended to put in front of a house a glass shutter; this was raised at night and during cold wet days. It obviated draught, whilst still allowing light to enter. The fowls were found to commence their lay more quickly and sustain it for a longer period. This idea is hardly practicable in big houses, but is ideal for the breeding pen. Blinds, however, prove very efficient for night usage. *Feeding*.—Nothing but the best and purest of foods should be used. Food is given to birds for three main reasons:—1, To build up the waste properties of the body; 2, to promote body warmth; and 3, to produce eggs. The first two are, to the bird, of primary importance. If, therefore, the fowl is deficient, the egg production suffers. Thus very often when hens cease laying, it is because they do not receive sufficient food to fulfil the three missions of that food. The greatest food economiser is a good house. Fowls must be fed regularly. If their food comes late and they have been excitedly jumping at the netting for half an hour, a great deal of damage has been done to their systems. Then follows the usual adverse consequences on egg production. An approved sequence for poultry feeding for egg production is as follows:—Wet mash in the morning, green feed at midday, grain at night. A recognised formula is as follows:—Bran, 1 part; pollard, 2 parts; green feed chopped, 30 per cent.-80 per cent. of above according to season; 5 per cent. of above, meat meal. The amount per bird is about 3ozs. of dry constituent of mash. Green feed at midday may be given in small bundles, tied 18in. from ground. This ensures a bird exercising or going hungry. About 1oz. of wheat per bird, spread an hour before sunset, is sufficient in the evening. An hour before sunset gives the birds sufficient time to consume the food before roosting. *Breeding*.—If the standard efficiency of the flock is to be maintained, breeding must receive special care. Eggs for setting must be carefully chosen. No egg of less than 2½ozs. should be used if it can be avoided, neither should eggs from hens of doubtful pedigree be used. Any egg which is misshapen must be discarded; it shows some deformity in the bird producing it. Either natural or artificial incubation is effective. If, however, hens are used, see that they are free from parasitic diseases, and always place eggs on the ground. August hatched chicks should do best in this district, thereby providing a five-six months pullet to begin laying in February. The following points are essential to successful poultry raising:—1. A recognised strain. 2. Good accommodation. 3. Sound, clean feeding. 4. Careful breeding. 5. Rigorous culling. (Secretary, Mr. R. Wilson.)

**PINKAWILLINIE**.—Meeting held November 1st, at the residence of Mr. E. Atkinson. Present: 16 members and a large number of visitors. Mr. H. Wheeler read a paper, "Fallowing," from the *Journal of Agriculture*. (Secretary, Mr. S. Johnson.)

**SMOKY BAY**.—Meeting held November 18th. Present: 10 members and two visitors. The meeting took the form of a Question Box. (Secretary, Mr. K. Harrison.)



## Summary of Meetings, &amp;c.

| Branch.          | Date of Meeting. | Members Present.    | Subject.                                                                    | Secretary.                  |
|------------------|------------------|---------------------|-----------------------------------------------------------------------------|-----------------------------|
| Goode .....      | 4/3/31           | 12                  | Question Box .....                                                          | E. Fear, Ceduna             |
| Mudamuckla ..... | 14/2/31          | 9                   | Harvest Report .....                                                        | T. Zippel                   |
| Mudamuckla ..... | 4/3/31           | 5                   | Paper—"Vegetable Culture," from <i>Journal of Agriculture</i>               | T. Zippel                   |
| Laura Bay .....  | 10/3/31          | 13                  | Discussion .....                                                            | W. Edson, Ceduna            |
| Elbow Hill ..... | 4/2/31           | 7                   | Harvest Reports .....                                                       | W. Cooper                   |
| Cungena ...      | 1/3/31           | 17                  | Address—"Fruit Trees and Vines," Mr. R. Loveday                             | H. Broad                    |
| Maltee .....     | 26/2/31          | 12                  | Harvest Reports .....                                                       | E. Schwarz                  |
| Maltee .....     | 1/4/31           | 16                  | Address—"Farming Methods in Scotland and Eyre Peninsula," Mr. N. McConnechy | E. Schwarz                  |
| Wallala .....    | 8/4/31           | 8                   | Question Box .....                                                          | C. Zippel                   |
| Cummins ...      | 14/2/31          | 6                   | Harvest Reports .....                                                       | H. Roberts                  |
| Kapinnie ...     | 26/3/31          | 15                  | Annual Meeting .....                                                        | S. Bulstrode, Brimpton Lake |
| Taragoro ...     | 2/4/31           | 12                  | Paper—"History of Transport," Mr. M. Guy                                    | T. Winters, Cleve           |
| Palabie ....     | 6/3/31           | 12                  | Paper—"Care of Horses," Mr. S. Jones                                        | E. Rashleigh, Wudinna       |
| Miltalie ....    | 7/3/31           | 9                   | Paper—"Co-operation," Mr. J. Story                                          | G. Smith                    |
| Miltalie ....    | 5/4/31           | 9                   | Question Box .....                                                          | G. Smith                    |
| Smoky Bay .....  | 4/4/31           | 14                  | Discussion .....                                                            | K. Harrison                 |
| Koppio ....      | 7/4/31           | 6                   | Discussion and Congress Report                                              | M. Gardner, White's Flat    |
| Yantanabie ..    | Sept.            | 30 and 100 visitors | Address—"The Australian Farmer and his Obligations to Secondary Industries" | F. Robinson                 |
| Laura Bay ..     | 14/10/30         | 11                  | Congress Reports .....                                                      | W. Edson, Ceduna            |
| Wallala ....     | 15/10/30         | 14 and 4 visitors   | Congress Reports .....                                                      | C. Zippel                   |
| Cungena ...      | 29/10/30         | 29                  | Tour of Inspection and Debate                                               | H. Broad                    |
| Warramboos ..    | 10/10/30         | —                   | Address by Mr. W. J. Spafford                                               | E. Adams                    |
| Warramboos ..    | 14/10/30         | 18                  | Paper—"Hay Harvest," Messrs. W. Norris and O. Murphy                        | E. Adams                    |
| Wallala ....     | 7/11/30          | 14                  | Discussion .....                                                            | C. Zippel                   |
| Wallala ....     | 12/11/30         | —                   | Crop inspection and address by Mr. W. Brownrigg                             | C. Zippel                   |
| Chandada ..      | 17/10/30         | 9                   | Congress Reports .....                                                      | H. Chewings                 |
| Kyancutta ..     | 4/11/30          | 18                  | Congress Reports .....                                                      | D. Fitzgerald               |
| Waddikee ..      | 13/12/30         | 9                   | Inaugural Meeting .....                                                     | V. Matthews                 |
| Rocks .....      |                  |                     |                                                                             |                             |
| Cummins ...      | 9/12/30          | 13                  | Inaugural Meeting.                                                          | H. Roberts                  |
|                  |                  |                     | Address, Mr. H. Adams                                                       |                             |
| Laura Bay ..     | 13/1/31          | 15                  | Paper—"Finance and the Farm," Mr. C. Collins                                | W. Edson, Ceduna            |
| Laura Bay ..     | 10/2/31          | 7                   | Discussion .....                                                            | W. Edson, Ceduna            |
| Pygery ....      | 3/2/31           | 17                  | Paper—"Tractor v. Horses," Mr. F. Ludemann                                  | A. Day                      |
| Goode .....      | 4/2/31           | 16                  | Harvest Reports .....                                                       | E. Fear, Ceduna             |
| Cleve .....      | 5/2/31           | 8                   | Formal .....                                                                | H. Matthews                 |



*Summary of Meetings, &c.—continued.*

| Branch.       | Date of Meeting. | Members Present. | Subject.                                                | Secretary.               |
|---------------|------------------|------------------|---------------------------------------------------------|--------------------------|
| Smoky Bay.    | 7/2/31           | 9 and 5 visitors | Paper—"Wheat Production Costs," Mr. G. Lovelock         | K. Harrison              |
| Mangalo ...   | 9/2/31           | 11               | Paper—"Care of Ewes and Lambing," Mr. F. Coles          | C. Hannemann             |
| Miltalie .... | 7/2/31           | 12               | Paper—"The Wool Industry"                               | G. Smith                 |
| Wudinna ...   | 19/2/31          | 8                | Address—"Sheep and Fat Lambs," Mr. W. H. Brownrigg      | C. Newbon                |
| Warramboo .   | 11/2/31          | 11               | Harvest Reports .....                                   | E. Adams                 |
| Taragoro ...  | 26/2/31          | 11               | Paper—"Motor Car and Truck on the Farm," Mr. L. McGowan | T. Winter, Cleve         |
| Green Patch   | 26/2/31          | 10               | Homestead Meeting .....                                 | C. Whillas, Port Lincoln |
| Pygery ....   | 3/3/31           | 11               | Paper—"Farm Economy," Mr. J. Edmonds                    | A. Day                   |

**EASTERN DISTRICT.****(EAST OF MOUNT LOFTY RANGES.)**

BOWHILL (Average annual rainfall, 12in.).

December 1st.—Present: 22 members.

**RURAL EXPANSION.**—The following paper was presented by Mr. J. Wallis:—"This subject covers a very wide margin, and the raising of 'Fat Lambs for Home Consumption and Export' comes within its scope. Owing to the very low prices offering for wheat the farmer inevitably has to look to his side lines and increase their production if he desires to balance his budget. The revival of the fat lamb industry will help the farmer very materially in this direction if worked on careful and economic lines." Extracts were then read from the *Adelaide Stock and Station Journal*. "Mate rams with the ewes in the proportion of one ram to 30-35 ewes. Rams well at work by mid-December will mean lambs dropping during the latter half of May, and they will be ready for market by the middle of September, three and a half months. Lambs marketed in November are far too late, bloom is lost very rapidly, and they become smothered in grass seeds. Lambs should not be kept any longer than possible. Once they start to go back in condition they soon become stores. Early feed is essential for the early fattening of lambs for market. To obtain this a good plan is to burn at least a portion of the stubble and sow it with an early variety of oats, preferably Early Burt, which grows quickly, has good foliage, and holds any tendency of the soil to drift. The chief point is the selection of the class of ewe most suitable for raising lambs in this district. I strongly favor a large-framed Merino, they are quieter than crossbreds and do not worry the fences. As regards rams, my selection is Border Leicester (1), English Leicester (2), Dorset Horn (3). The progeny of these, from Merino ewes, are in great favor with the butchers, also the export buyers; they are well set-up, nice frames, square built, and quick growers. Sheep and lambs are very susceptible to bruising if not very carefully handled when yarded or passing through gates, &c., this applies particularly to lambs. The poking with sticks is to be avoided, do not grab lambs by the wool, by so doing those for export are rejected on account of bruises. If a sheep is grabbed by the wool the latter is immediately injured and deteriorated in value. Catch by the hind leg with the right hand, keeping it low down, and pass the left hand in front of the forequarters, then the right to under the belly. By lifting the leg high the muscles and flesh are strained and become bruised, and in the case of lambs, are rejected for export. Drivers of transports conveying lambs to market must exercise great care with them, they are very tender, the sides of hurdles, &c., on transports should be padded. The 'Corriedale' is the coming sheep and it will considerably benefit the fat lamb industry. The breed is being kept true by the formation of a society."

A previous meeting held on November 17th was attended by 12 members, who inspected Mr. A. Just's crops of Gluyas, Ford, and Felix. Mr. A. Spry read a paper, "Farm Improvements." (Secretary, Mr. M. Banks.)



## BOOLGUN.

February 26th.—Present: 12 members.

**SCRUB ROLLING.**—Mr. E. Werfel read the following paper:—"The farmer's aim should be to get the land cleared as soon as possible. It does not matter how large the section may be, it is only the land that is cleared from which he obtains his living. Many farmers clear a few hundred acres and crop it until it becomes too dirty and worn out to grow a payable crop, whereas they could leave it for grazing, and clear more of the scrub land and be more sure of a clean crop. The best time to roll scrub is during June, July, and August; the sap is then "down" and the scrub breaks better. By rolling early it gives the shoots a better chance to grow before burning time. The best time to burn is late in February. If burnt too early one often has trouble with the shoots in the crop. Leave the scrub lay for two summers before burning. As to burning after the first summer, I experimented with a hundred acres. The portion that was in crop after laying for two summers yielded 50 per cent. more wheat, 60 per cent. less shoots, and 50 per cent. less snags than that portion which had only laid the one summer. Scrub rolling is heavy and rough work for horses, therefore see that the team is in good condition and well fed. Work the horses for half-days for a few days until they become used to the work. Do not try to pull down a tree or a clump that is too heavy for the team; it is better to nick these trees with the axe. Do not work horses when they become sore; it is better to spell them or put them on to some other kind of work." (Secretary, Mr. J. Palm.)

## KULKAWIRRA.

October 14th.—Present: 15 members.

**FARM BOOK-KEEPING.**—Mr. J. Kelly read the following paper:—"In these days of high costs of production and low prices for farm produce, it is of vital importance that farmers should keep proper books. Not only will a system of book-keeping show what profit or loss is being made in the farmer's various activities, it will also do away with that worrying and straining of memory when the income tax return is due. Keeping a record on the heel of the cheque book is very unsatisfactory, and, at the best, will only give the amount of cash available. How many farmers can definitely say that they cannot produce wheat for 4s. per bushel, or the exact amount of profit on the last pig sold? When entering your books it is a wise plan to remember that the three chief principles of book-keeping are—(a) The record should be so explicit and minute in detail that, at any subsequent time, the nature and character of the transaction may be readily perceived; (b) As the leading principle of book-keeping is classification, the transactions should be so classified that at any time the total results of such transactions, or of any particular class thereof, during any given period, may be readily ascertained. (c) The system of account keeping should be so devised that the maximum amount of information may be obtained, with the minimum of clerical labor. Three books at least are necessary for farm book-keeping—(i.) Diary, (ii.) Journal, (iii.) Ledger. In the Diary the daily work should be entered, together with any items of importance. This is the farmer's book of reference for such things as "when the sheep were dipped," and "what date the fallow was last worked." The Journal is known as the "book of original entry." In it should be posted, in full, all accounts. When entering this book it should be born in mind that memory plays no part in book-keeping. A Ledger is a book of final record, made up of accounts representing all the activities of the farm. From the trial balance drawn from it at the end of any period, statements of assets and liabilities and profit and loss can be prepared. The left-hand side of each page is for the entry of debits, and the right-hand side shows credits only. The difference between the totals of the two sides is the balance of the account. As all postings are made from the Journal, the folios should be indicated in the ledger accounts. In addition, I recommend that a "Paddock History Book" be kept. Once each year draw a plan of the block in it, showing the several paddocks, and color each paddock to show what condition it is in. For example:—Yellow for crop, brown for fallow, green for feed, &c. In one corner write any information of importance culled from the Diary, such as "date started and finished fallowing," "date started and finished seeding," "number of bags of wheat stripped," "number of tons of hay cut." In this way you will have the whole history of your farm at a glance. *Double Entry Book-keeping.*—As the name indicates—double entry book-keeping—the system in general use to-day—is based upon the principle that every transaction has a two-fold effect. Every sale, while it increases the cash, decreases the stock in hand. The payment of wages decreases cash, but results in an increase in services rendered. An equilibrium of accounts is maintained by equal entries for every transaction; a debit for every credit. Debits are shown on the left-hand side and credits on the right. It is often difficult to determine which account to debit and which to credit. The following principles may be stated as governing all business transactions:—(a) Debit the account with that which comes in; (b) Credit the account with that which goes out; for example:—Bought one ton of hay for £5. The account with hay receives the benefit of £5 worth of hay, and is therefore debited, the cash account suffers a corresponding reduction, and is therefore credited £5. The double entry system of book-keeping



affords a number of advantages that can be enumerated as follows :—(a) It provides for accounts representing every item of wealth possessed by the farm, and for every debt owed by the farm ; (b) It arranges separate classified accounts so that they disclose the expenses of the farm, the income, and the character of each class ; (c) It affords a basis for recording accurately the farm activities, the effects and results ; (d) By having equal and off-setting entries for each transaction it provides for an automatic check on the accuracy of the records ; (e) Double entry book-keeping also furnishes readily available information for statistical records. For those farmers who do not desire to go to the trouble of installing the double entry system, I recommend that they keep all their accounts under separate headings, such as "Horse Feed," "Fuel," "Repairs," "Machinery," "Wages," "Household Expenses," &c., and that they keep an account of all livestock transactions, natural increases, depreciation, &c. Pay all money received into the bank, and pay all accounts by cheque. (Secretary, Mr. H. Elliott, Karoonda.).

#### LOWBANK.

October 8th.—Present : 10 members.

**HARVESTER v. STRIPPER.**—The following paper was read by Mr. E. Koop :—The stripper is more suited to mallee country or any country that is sandy and hilly, it is lighter in draught and also saves more grain, it being very difficult to keep an even speed with the harvester while going over sandhills, this causes the scives to load and grain is often wasted. The stripper also has an advantage over the harvester in rough stumpy country. Owing to its greater weight and many working parts, the depreciation on the harvester is much greater. There is, of course, a considerable saving in labor by using the harvester, but this is more than off-set by the value of the cocky chaff, which can all be saved by using the stripper. Cocky chaff is a valuable asset in this district, and this has been brought home to us very forcibly during the last few seasons. It requires three extra horses in this district to get over the same area in a day with the harvester as with the stripper. Getting away from the mallee country where the land is firm and more or less level the harvester can more than hold its own with the stripper, owing to the big saving in labor and depreciation, also the cocky chaff is not so valuable there. Those districts are not so subject to droughts, and there is usually plenty of feed for the stock. A good supply of hay is usually cut, and the extra expense to save the cocky chaff is not warranted. The harvester also pulls at least a horse lighter in those districts as compared with our sandhills.

**BOOK-KEEPING.**—Meeting held November 5th. Present : 14 members and four visitors. A lecture was given by Mr. Armstrong, manager of Waikerie branch of the State Bank, on "Book-keeping on the Farm." In his address he pointed out the necessity for book-keeping in every business. Mr. Armstrong endeavored to simplify the method to suit the farmer, and deemed the single entry sufficient for the average man on the land ; otherwise, in its full sense, the double entry was the correct method. The speaker pointed out that the double entry was most reliable in business, but, as most farmers did not have time, the single entry recorded in an ordinary exercise book was sufficient, but the proper books to be kept for commercial concern to complete an up-to-date system were—Cash book, Purchase and Sales books, Journal, Ledger, and Petty Cash. Another necessity for books to be kept was, in the event of a proprietor desiring to dispose of his business, the first requirement of a prospective buyer would be to inspect the books. If there were no records of operations it was unlikely that any business would be done, for it was only on a knowledge of the operations that a buyer could decide what it would be worth if it was a prosperous one. Should one at any time approach a banker the first request would be for a statement of position. If this could be given from properly kept books, it inspired confidence at once. Expense could often be curtailed when income tax returns were due ; if proper records were kept the return could very easily be furnished by the farmer. (Secretary, Mr. L. Gayer, Waikerie.)

#### OVERLAND CORNER (Average annual rainfall, 10-50in.).

October 4th.—Present : 18 members and four visitors.

**QUESTION BOX.**—During the afternoon members inspected the crops and stock on Messrs. Loffler's property. In the evening the following questions were discussed :—"What size should paddocks be on 2,000 acre farms in this district?" Answer : After a good discussion it was generally thought if possible, to have paddocks from 50 acres around the homestead to about 320 acres further away. "Is it advisable to leave windbreaks?" Answer : All members agreed that windbreaks should be left every 30 to 40 chains, about two chains wide, and running north to south. "On what side of the break should the fence be?" Answer : Most members favored the east side, while a few preferred the west side. "Should white stemless thistle be destroyed?" Answer : These were thought to be harmless, and would provide feed for sheep in time of droughts. "Can we successfully grow wheat at present day prices ; if not, why carry on?" Answer : All were agreed that this was impossible with wheat at its present price (below 2s. bushel on river bank). The chairman remarked that no business would carry on if it could not make it pay, but members all agreed that the farmer had no alternative but to carry on. "What is the best harvesting machine for this district?" Answer : The two members who spoke on this question were of the opinion that anyone cropping upwards of 600 acres should have both stripper and harvester. (Secretary, Mr. H. Loffler.)



## OVERLAND CORNER (Average annual rainfall, 10-58in.).

November 4th.—Present: 12 members.

**FODDER CONSERVATION.**—The following paper was contributed by Mr. G. Chesney:—Farmer generally, and mallee farmers in particular, have many things to contend with during the course of each year's operations. There is nothing, however, which causes greater concern than the want of a sufficient supply of feed for his stock during dry periods when feed in the paddocks is scarce or non-existent. It is, therefore, most important that suitable provision should be made to meet such circumstances. We have passed through one of the most devastating droughts in the history of this State and probably for the whole Commonwealth. The effects of such droughts to farmers are very disastrous under any circumstances; but, when little or no provision has been made to conserve feed, it is a calamity. Australia is subject to these dry periods, so that it is natural for us to expect such visitations in the future, and make provision accordingly. Before making a few suggestions in this direction I desire to refer to some facts on food values, Bulletin No. 153, Department of Agriculture, "Cereals and Cereal Hay." The relative merits of oats and wheaten hay is not infrequently a subject for debate at Bureau meetings, and those accustomed to feeding horses with good, sound wheaten hay are loth to believe that any other fodder could replace it with advantage. Notwithstanding the many valuable properties of wheaten hay, the outstanding qualities of well-saved oats hay must place it in first position. Apart from the fact that chemical analysis and digestion trials combine to give it a higher value to the extent of 10 to 15 per cent., there is, unquestionably, some principle peculiar to the oat plant which has an exciting and stimulating effect on the animal system, and this in itself is sufficient to warrant a preference for oats hay whenever a choice can be made. For dairy cattle, oats hay is better than wheaten, as it appears to encourage milk secretion to a greater extent, and, when fed in the sheaf to cattle or sheep, there is less waste. Oats are unsurpassed as grain food for horses and ruminants, and, fortunately, in normal times they are relatively cheap. The high percentage of digestible fats which they contain makes them particularly suitable for animals that are required for heavy draught or fast work, and the stimulating influence of the husks on the bowel walls aids digestion and assimilation. New oats should be fed with care as they are apt to cause colic. When they are 10 to 12 weeks old they are usually safe; but, if delay is impossible, the laxative effects may be reduced by mixing with salt and exposing to the air for three or four days. Cocky chaff consists of husks of grain, together with portions of the straw and leaves, inferior grains, weed seeds, and rubbish. On the whole it is more valuable than straw weight for weight, and is generally better appreciated by stock. Like straw, it is low in nutrients and rich in fibre. Oaten cocky chaff is the richest, and that obtained from beardless barley comes next, and then wheaten. The foregoing facts should be helpful in considering the problem of feed conservation. Most writers that I have read on this subject stress the importance of ensilage, and I have not the slightest doubt about the merits of such a method of conserving feed, provided, of course, that the district is suitable to that method being applied economically. Such would not be the case in light mallee country. One of the simplest and most economical means of saving feed is in the paddocks—natural pastures. How many farmers give this matter the consideration it deserves. Compare the difference in the stock-carrying capacity of a paddock which has just been left out after a crop of wheat that had a fairly liberal dressing of super with one that has been left to grazing for some years, the difference is most apparent. A great deal could be done in this direction, and to leave out a paddock for pasture, there should be the same consideration and forethought given as in the case of wheat or any other crop. To get the best results, grow a crop of wheat off fallow, using a liberal supply of super, followed by a crop of oats with another dressing of super. Left out to grass in this way, it will be surprising the amount of feed that will grow in comparatively dry years. I recommend cutting some hay each year, when possible: sufficient for the purpose of seeding and fallowing, keeping for reserve oats and cocky chaff. To keep hay for any length of time, either loose or in sheaves, requires a lot of protection, not only from mice, but against fire. There is one method of keeping hay which appeals to me, and that is to bale it. It would be much safer from destruction by mice, and opens up much fresher and better feed. It would not be necessary to use a binder when cutting, which is an advantage in rough country. Baling would be an ideal method of conserving straw. Oaten straw should always be cut or logged, raked up whenever possible and put in a stack, it will be found a valuable standby in times of drought. Oats should be grown much more extensively than at present is the case in this district for several reasons—1. If sown early, they make good pasturage for several months when grass and other herbage is scarce in the paddocks. 2. They can afterwards be reaped at harvest time, supplying one of the best grain feeds procurable for horses. 3. They improve the land, not only as a feed paddock, but the grass immediately following the next wheat crop will also benefit. Cocky chaff should never be wasted. However, to store in sheds all the chaff that would be taken off in a good season would require a great amount of space, more by far than many of us could make provision for. For that reason, I suggest a method which will cost little more than the work of erecting it and conserve the chaff in perfect condition for years. The first thing to consider is a suitable position; find a place where there is not a lot of loose sand and in a sheltered position, then proceed with the erection of a netting wire enclosure, size according to your requirements. Height should be not less than 8ft. or 9ft., and the posts leaning outward several inches to keep rain from running down the sides. When filling the enclosure, pack the chaff firmly, raising it well above the top of the wire. It can then be left to set for a time before covering with a good coating of straw. Use a few lengths of plain wire to secure it from blowing up with the wind. To use sticks for this purpose will cause rain to penetrate the straw. Oats are the best of all



feeds which can be grown profitably in this country, both for storing purposes and for use at all times. Fed with cocky chaff there is no other method of feeding horses to compare with it if the proper quantities are given. Not only is it an easy way of feeding horses, which is a consideration in busy times, but there is always much more life and stamina in horses fed on oats than there is with any other feed which we grow. Oats have a greater attraction for mice and other pests than most other grains, and to keep them for any length of time in bags is asking for trouble. To overcome this difficulty I suggest the erection of silos, which appear to be the only solution of the problem. Almost any handy man could erect a silo of corrugated iron to hold several hundred bags of oats, which would cost very little more than the price of bags, and then it is there for all time. It could be built either on the ground with a cement floor or it could be elevated. Having it elevated would enable one to use a spout for the purpose of emptying. Either principle would be much superior to bags, and, in the long run, would be considerably cheaper. *The proper and judicious use of such feeds as we have on hand.*—Most of us within the last three years have been in the unfortunate position of having to buy feed to put in the crop, and I venture to suggest that in every case the feed was measured out with care and judgment. Are such methods applied when cocky chaff is being used? I do not think so, and that is a very grave error, because feed is wasted by giving more than is necessary. When there is an abundance of cocky chaff the mangers are kept full. Use the same care and judgment as in the case of chaff which has to be bought. You will not only save feed, your horses will do much better. (Secretary, Mr. H. Löffler.)

#### RENMARK (Average annual rainfall, 10.52in.).

Meeting held November 13th. Present: 11 members and six visitors, Mr. F. Ferguson delivered an address, "The Case for the Queensland Sugar Grower." (Secretary, Mr. W. Meier.)

#### WAIKERIE (Average annual rainfall, 9.6lin.).

November 14th.—Present: 12 members and two visitors.

Mr. H. Milner delivered an address, "Fodders and Their Value for Pig Feeding."

**DIPS FOR SULTANAS.**—The following report of a Conference held at Mildura to discuss the subject of "Dips for Sultanans" and the progress that the district has made towards supplying the requirements of the London market was given by Mr. R. Howells at a meeting held on December 11th. *Circumstances Leading up to the Conference.*—For many years the boiling caustic dip met all requirements of the various markets our fruit was sent to; then came the demand for light colored fruit. The experiments of different growers and groups of growers with dips of all descriptions immediately caused chaos in the various packing sheds. Fruit of light color down to samples which have been referred to as "spotted dog" came forward. This state of affairs made our position worse than it was before on the overseas market. Then came the typing of the different colors which made for a large number of lines of fruit, which did not lend themselves to profitable marketing. The packing organisations then turned their attention to blending the various types within the grades in an endeavor to secure the long lines of fruit so desirable on the overseas market. This system was necessarily expensive. There came into being the classer at the shed door and the costly machine used for blending the fruit before passing it through the grader. In some districts the blending of the fruit has been very successful, others the reverse. Our pack last year stood out, both for quality of fruit and a high standard of packing, never before reached in the history of the companies' operations. Last season the efforts of growers in putting forth such an endeavor to produce a high quality sultana is worthy of the highest commendation. Our pool pack for sultanans on the London market this season has received the highest prices paid, and, furthermore, we are receiving our full share of sales. Growers, despite the gloomy outlook, stuck to their guns, and, generally speaking, achieved a splendid result. Despite the pessimistic utterances of some men, do not be disheartened, still strive after a quality sample, and we will carry on where others are going to the wall. Follow up your efforts of last season, and we will produce the goods in the best possible manner. We are keen on keeping up the good reputation made for our pack last season. Despite the shed's efforts at blending, and we had lines of different types ranging into hundreds of boxes, the doubt exists whether we are working on right lines. What will happen if the blended fruit has to be kept a long time before it is sold? Just about every grower has his own ideas on dipping sultanans and with the innumerable formulas being used, what will be the result when the fruit has matured by months of storing in different temperatures? Will the blend retain the color as when it is packed? I am certain that it will not, for the different chemicals used at different strengths will alter the color of some of the berries; some will undoubtedly go darker, and when the fruit is opened up for sale, the line will not be true to the type marked on the outside of the box. This contention has been proved by different sheds, and it seems necessary to standardise dipping methods, and for this reason the Mildura Conference was held. *Uniform Dip.*—In opening the discussion, Mr. Howie said that packers should approach the Conference with the view in mind that



the dried fruit industry was too big to develop piecemeal, and it would not get anywhere as an export industry, if they did not get together and pool knowledge for the good of all. Mr. F. Arndt (South Australian Department of Agriculture), Mr. A. Lyon (Department of Science and Industry), and Mr. R. Voullaire (of Merbein) then gave interesting expert information on the use of the different dips. Mr. Cleary (Aurora) spoke with reference to the Harry Johnson dip, stating that so far as the 1929 pack was concerned 70 per cent. of the fruit so treated had turned out four and three crown quality. Messrs. B. Haynes, W. Pardy, A. Ingerson, P. Malloch, and several other delegates also spoke on their experience with the different dips. After much general discussion it was resolved that a committee be formed with a view to bringing in recommendations to this Conference. Committee appointed was Messrs. Seary (convenor), Haynes, Palmer, Howells, Malloch, Lyon, and Arndt. Recommendations of the committee:—1. "That in the light of past experience three standard dips are sufficient for the Australian industry and that more are undesirable. The variations in dips devised by individuals or small communities have resulted in a multiplicity of types without any compensating advantages; increased cost of production, and increased difficulties in marketing." 2. "That the three standards recommended by the Conference of packers in consultation with Messrs. Lyon and Arndt are:—(a) cold dip; (b) modified hot caustic dip; (c) mixed dip. That practical experience of the industry, confirmed by the research work, indicates that the cold dip and mixed dip give satisfactory results only when the condition of the fresh fruit is satisfactory and drying conditions favorable, therefore, in the interest of standardisation, it is strongly recommended that the modified hot caustic dip be recommended for general use. That this Conference request Mr. Lyon, after consultation with the Department of Agriculture in the States concerned, to prepare an advisory pamphlet descriptive of the preparation and use of these standard dips."

#### WAIKERIE (Average annual rainfall, 9.6in.).

February 13th.—Present: 17 members.

HARVESTING OF SULTANAS.—Mr. H. Beriman (District Horticultural Instructor), in an address on this subject, dealt with the factors which, apart from dipping, were primarily responsible for much of the low-grade fruit. The time to begin picking was more or less governed by the amount of rack space. In any case, picking should not begin until the grapes showed a Beaume test of 13 per cent. If they were picked sooner the loss in weight was too great. He had set a Beaume reading of 13 per cent. as a starting-point, but this could be taken as a guide only, as the maximum Beaume obtainable showed considerable variation on different vineyards and in different seasons. During recent years the chief purpose of the grower had, or should have been, to produce quality fruit, and the difference in the values of the various grades was a big incentive to spur him on to that end. Of what value was correct cultivation, irrigation, fertilising, and dipping if one had not sufficient rack space to handle the crop. In all the settlements he found growers working right through the year using all the knowledge they possessed in order to produce a heavy crop of sultanas, and very often they achieved their purpose, but if there was not sufficient rack space to handle it, the labor and cost of producing it was very largely lost. Most of the one and two crown sultanas were traceable to either uncovered racks or a shortage of rack space. (Secretary, Mr. R. Thompson.)

YOUNGHUSBAND.—Meeting held November 5th. Present: Mr. G. Mann (chair), seven members, and two visitors. Mr. Mann read an instructive paper, "Side Lines on the Farm." (Secretary, Mr. H. Gowling.)

## **M. F. HODGE, A.C.I.V.**

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*Summary of Meetings, &c.*

| Branch.         | Date of Meeting. | Members Present.   | Subject.                                                             | Secretary.            |
|-----------------|------------------|--------------------|----------------------------------------------------------------------|-----------------------|
| Nunkeri ....    | 5/11/30          | 8                  | Formal .....                                                         | F. Ling               |
| Nunkeri ....    | 11/3/31          | 12                 | Formal .....                                                         | F. Ling               |
| Overland Corner | 3/3/31           | 12                 | Harvest Reports .....                                                | H. Löffler            |
| Overland Corner | 7/4/31           | 14                 | Address—"Reducing the Cost of Wheat Production," Mr. R. L. Griffiths | H. Löffler            |
| Marama ....     | 18/3/31          | 15                 | Harvest Reports .....                                                | T. Hinkley            |
| Kulkawirra .    | 10/2/31          | 8                  | Paper—"The Wool Industry"                                            | H. Elliot, Karoonda   |
| Kulkawirra .    | 17/3/31          | 10                 | Formal .....                                                         | H. Elliot, Karoonda   |
| Kalyan ....     | 18/3/31          | 10                 | Paper—"Stubble Burning," Mr. C. Rawolle                              | R. Lang, Goondooloo   |
| Yurgo .....     | 12/3/31          | 7                  | Annual Meeting .....                                                 | M. Walker             |
| Bowhill .....   | 2/3/31           | 13                 | Question Box .....                                                   | M. Banks              |
| Parilla .....   | 17/3/31          | 9                  | Harvest Reports .....                                                | C. Foale              |
| Lameroo:...     | 21/3/31          | 17                 | Address—"Veterinary Lodges," Mrs. Moncur                             | B. Koch               |
| Clanfield ...   | 6/3/31           | —                  | Address—"Preparations for Seeding," Mr. R. L. Griffiths              | L. Orwell, Lameroo    |
| Netherton ..    | 1/4/31           | 15                 | Annual Meeting .....                                                 | C. Wilkin, Yumali     |
| Younghusband    | 4/3/31           | 9                  | Address—"Sheep and Wool," Mr. C. H. Goddard                          | H. Gowling, Mannum    |
| Younghusband    | 1/4/31           | 7                  | Paper—"Preparing the Clip," Mr. W. Schmidt                           | H. Gowling, Mannum    |
| Renmark ...     | 8/4/31           | 11                 | Addresses—Messrs. W. J. Spafford and H. B. Barlow                    | W. Meier              |
| Lowbank ...     | 8/4/31           | 12                 | Address—"Cost of Wheat Production," Mr. R. L. Griffiths              | L. Geyer, Waikerie    |
| Copeville ...   | 26/2/31          | 10                 | Experimental Plots Report                                            | G. Sutherland         |
| Jervois ....    | 28/3/31          | 12                 | Re-organisation of Branch                                            | M. Wilkir             |
| Boolgun ...     | 9/4/31           | 17                 | Address—Mr. R. L. Griffiths                                          | J. Palm               |
| Moorlands ..    | 17/4/31          | 11                 | Address—"Wheat Production Costs," Mr. R. L. Griffiths                | L. Ortloff            |
| Coomandook      | 24/4/31          | 11                 | Discussion—"Rearing Pigs"                                            | W. Trestrail          |
| Kalyan ....     | 21/4/31          | 9                  | Address—"Wheat Production Costs," Mr. R. L. Griffiths                | R. Lang, Goondooloo   |
| Tulkineara ..   | 8/10/30          | 13                 | Address—"Ailments of the Cow," Mr. J. Holt-ham                       | F. Vardon             |
| Bugle .....     | 6/10/30          | 14 and 7 visitors  | Address—"Sheep and Wool," Mr. C. Goddard                             | B. Auricht, Taldra    |
| Meribah ....    | 13/10/30         | 16                 | Congress Report .....                                                | E. H. Carr            |
| Kulkawirra .    | 11/11/30         | 18                 | Address—"Sheep and Wool," Mr. C. Goddard                             | H. Elliot, Karoonda   |
| Kanni .....     | 6/11/30          | —                  | Debate .....                                                         | J. Woodhead, Waikerie |
| Pinnaroo ...    | 17/2/31          | 8                  | Paper—"The Wool Industry," H. Badman                                 | H. Badman             |
| Renmark ...     | 9/12/30          | 14 and 32 visitors | Addresses by Messrs. E. Seary, A. V. Lyons, and F. Arndt             | W. Meier              |
| Renmark ...     | 12/2/31          | 11                 | Address—"Manufacture of Wine," Mr. K. Weidenhofer                    | W. Meier              |
| Lameroo, ...    | 21/2/31          | 18                 | Harvest Reports .....                                                | R. Koch               |
| Netherton ..    | 4/3/31           | 10 and 6 visitors  | Address—"Preparations for Seeding," Mr. R. L. Griffiths              | C. Wilkin, Yumali     |



**SOUTH AND HILLS DISTRICT.****ASHBOURNE.**

After having been in recess for some time, meetings were resumed on October 23rd. There was a good attendance of members and visitors, and addresses were delivered by Messrs. H. C. Pritchard and H. J. Apps of the Department of Agriculture.

**LICKS FOR SHEEP.**—Meeting held November 5th. Present: 12 members. Mr. M. Horwood addressed the meeting on "Licks for Sheep," the former part consisting of the reading of an address by Mr. Marston, the chief of the Division of Animal Nutrition, delivered at Mount Gambier. This was supplemented by an original paper embodying Mr. Horwood's experience. It was stated that for wool growing a lick containing cystine was necessary, as this substance was present in wool to the extent of 13 per cent. Legumes, such as clover, were deficient in cystine, and did not provide an ideal wool-growing diet. Top dressing did not pay on land with less than 20in. rainfall, but some of the benefits of top dressing could be achieved by feeding phosphate in lick form at a very small cost. Iodine was present in sufficient quantities in practically all Australian soils, therefore a lick containing iodine was not necessary. A lick Mr. Horwood used was mixed in the following proportions:—100lbs. rock phosphate; 100lbs. salt; 6 per cent. molasses. One sheep would require 4lbs. to 5lbs. per annum, and the cost would be roughly 2½d. per head. Members stated that they had found rock salt to be very much liked by sheep, but that was practically their whole experience as regards licks. It was surmised by some that a lick for wool production might not be the most suitable for fattening purposes, but the speaker, while agreeing with this, said that the lick he was using (above referred to) had improved the health of the sheep, and healthy sheep would grow more wool as well as fatten better.

**BANKING AND FINANCE.**—Meeting held December 3rd. Present: 10 members and six visitors. Mr. F. Laycock, Manager of the Strathalbyn Branch of the National Bank, in the course of an address on the above subject, said banking and finance were matters which it was necessary at these times to understand more fully than had been done in the past, and that individuals should take a more active part in determining the management of the affairs of the nation was the hope expressed. The functions of a bank were to trade in money as a merchant trades in goods. The margin between interest paid on deposit and interest accruing from loan represented the profits to the bank in the same way as a merchant received a margin on the purchase and sale of goods. The advantages of a bank were mainly:—(1) To provide a safe depository for funds; (2) to save time and trouble; (3) to facilitate the payment of debts; (4) to lend on overdraft; (5) to provide safe keeping for deeds and securities; (6) for reference. Among the functions of a bank was the issue of notes for currency. This, however, in Australia was all done by the Commonwealth Bank. The issue of notes in lieu of coinage multiplied the usefulness of currency. The coin reserve was about 33½ per cent. of the note issue, and this proportion was looked upon as perfectly sound policy. As, however, all notes issued were not in circulation, the proportion of coinage was slightly greater than the above. The value of life assurance was emphasised, the speaker saying that in the institution with which he was connected it was necessary for employees to take out a policy to supplement the existent provident fund. That farmers, in common with other businesses, should take stock at least once annually was also expressed, as this enabled a more accurate survey of the operation of the business. In this connection, it was also stated that it is wise for a customer to acquaint his banker with the state of his business, as this established a feeling of confidence and facilitated business. In selecting a bank, care was necessary, although in Australia any one of the associated banks was quite safe. With regard to the all-too-much talked of repudiation, it was made apparent quite safe.

**POTATO CULTURE.**—Meeting held January 28th. Present: 10 members. In the course of an address on the above subject, Mr. C. Pitt said that his intention was to deal more particularly on the care and selection of seed. The potato was second to wheat as a staple food, and therefore commanded a great deal of attention. The prevalent idea that imported seed gave better results than local was because local seed, as a rule, was the culls after the marketable tubers had been disposed of. The speaker's experience in this matter was that, after a number of years' saving from his own crop, the results were in no way depreciating; in fact, the reverse was the case. This, however, was the outcome of selecting the seed as the crop was dug, when any good plant would be put aside and saved for seed. Another point stressed was the advisability of planting seed dug before the crop was quite mature. The results of various authoritative experiments proved conclusively that immature seed gave better returns than that dug when the haulms were dry. The opinion that cutting the seed up to 24 hours before planting did not adversely affect it, provided it was not exposed to the sun, was expressed. An alternative to farmyard manure was the practice of ploughing in such green manure as peas, mustard, and rye. This enabled the soil to retain its original



character and productiveness. Mr. V. Payne, in the following discussion, stated that he found the stem end of the seed potato inferior to the other end. He favored a change of seed for early planting, at any rate with Snowflakes. He obtained the best results by importing seed each year. Mr. W. Carter stated that scab was prevalent before the advent of super. The opinions as to manuring were that super with potash in quantities not above 10cwts. to 15cwts. per acre of the mixture was preferable. (Secretary, Mr. H. H. Pitt.)

March 4th.—Present: 14 members.

FODDER CROPS.—Mr. V. Payne read the following paper:—"Many farmers now recognise that they must keep the maximum amount of stock to enable them to obtain the greatest possible yields from their holdings. It is questionable whether this is being done, especially in our southern or heavy rainfall districts, owing to the fact that special crops for fodder are not being grown. Since the decline in prices for all our products of from 30 to 50 per cent., a serious review of our primary production must take place, to enable us to obtain a greater net return. There is food for thought in the fact that as a rule we find the winter half gone before the stock are able to get sufficient green feed. Fodder crops could be grown to fill this gap. These could be divided as follows:—First and best, lucerne; second, peas; third, oats; fourth, maize and others. The feeding value of lucerne is well known, but unfortunately the flea is a serious pest. The best time, generally speaking, for sowing in this district would probably be late August and September. If the seed bed is well prepared, a heavy sowing of seed, say, 20lbs. to 25lbs. per acre, applied, and as soon as the plant was strong enough, to be cut, the effects of the flea would certainly be lessened. With irrigation four or five cuts could be obtained during the season after the bed had been established. Lucerne can be fed with a big profit to dairy cows, ewes and lambs, and breeding sows. If fed in conjunction with oatens chaff and bran, there is probably no more suitable ration for a dairy cow. It is usually recognised that 1 acre of lucerne, well irrigated and manured, will produce enough green feed during the summer months to keep from seven to ten dairy cows, if fed in conjunction with the necessary dry feed. Peas fed dry are probably one of the best fattening grains. Pigs have certainly not received the attention they should in this State. Usually they are regarded as a side line of a dairy farm. This, to an extent, is true. The skim milk is a great aid in fattening and rearing young pigs. Pigs are a paying proposition on almost any type of farm. I have already quoted lucerne for breeding sows and little pigs, and to follow this up with a good paddock of peas would be a very reliable and profitable practice. The lamb breeder, also, is able to take advantage of the pea crop, selling the lambs at from 11s. to 13s., instead of at from 6s. to 8s. for grass grown lambs. Ewes and wethers can also be fattened on peas profitably. The practice of sowing oats for early green feed, especially on the better lands, has probably no equal. To sow oats on land cropped by potatoes after the first autumn rains is unquestionably good. Best results cannot be expected from land freshly broken up, as so much more rain is required to render it fit for sowing. Two to 2½ bush. is the best amount to sow. Some farmers advocate drilling both ways, in order to obtain a better plant, and reduce subsequent damage by stock, principally sheep. The oat crop can be grazed off until August, and a good hay or grain crop obtained. This is in the nature of obtaining two crops at once, first the green fodder and then the grain. Oats are an excellent cover crop for subterranean clover. Maize is principally used by dairymen. Probably a greater amount of fodder per acre can be grown from this crop than from any other. September and October are suitable months for sowing, and swampy land is preferable. The growth is prolific, as is also its soil-improving tendencies. Maize may be used as ensilage or fed to cows with chaff and bran. Fed in conjunction with the natural grasses only, it is not a profitable crop. Barley is a splendid early feed, but has not the staying powers of oats, nor has it the same value for hay. It is a really good fattening grain. Turnips and rape are also good fodder crops, being splendid for sheep and pig grazing, both being easily grown on good soils. On our good lands a good rotation of crops would be:—First year, natural grasses; second, peas; third, potatoes, turnips, or rape; fourth, green feed, oats, &c. Land worked in this way will not run out, but will produce good crops year after year, under favorable weather conditions." An extract from a publication on Sudan grass, to the effect that it was a rank feeder, was similar in composition to Johnson and other similar grasses, was a laxative, was drought resistant, and under good conditions produced more hay than any other crop, completed Mr. Payne's paper. Mr. H. R. Meyer considered that lambs did better in paddocks where subterranean clover is not so plentiful, i.e., where rye and other grasses of that kind predominated. Messrs. Kirkham Brothers had proved that clover was a pronounced success on second-class land. It was readily agreed that lucerne was the "King of fodders." (Secretary, Mr. H. Pitt.)



## BALHANNAH.

November 7th.—Present: 18 members.

Mr. W. J. Spafford (Deputy Director of Agriculture) gave an address, "Manures."

At the meeting held on December 5th, which was attended by 14 members, the Secretary read a paper, "The Apple and its Cultivation." (Secretary, Mr. C. Grasby.)

## CURRENCY CREEK.

November 10th.—Present: 12 members.

THE DEPARTMENT OF AGRICULTURE AND THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.—Mr. E. Skewes read the following paper:—The Bureau was established in South Australia in the year 1888, the first meeting being held on April 10th in that year. At the close of the first year, the membership roll contained 53 names, and the number of Branches then in existence was five. Those figures have since increased very rapidly, and there are at present 8,337 members and 305 Branches, a truly remarkable record and an indication of the widespread nature of the Bureau. The number of new members enrolled for the last financial year was 610, and the number of new Branches established for that year 26, which shows that there is still room for expansion, and also that in spite of the hard times we are now experiencing, the Bureau is continuing to make very satisfactory progress. During the year 1912 it was decided to confer life membership on those members who render services to the Bureau that are worthy of special recognition. There are at present over 280 such members. It is usual that this distinction should not be made until a member has been connected with the Bureau for at least 20 years. Membership of the Bureau contains a number of privileges and facilities for the obtaining of information of value to those engaged in primary production. The services of the Departmental officers are at all times available to members, and the District Instructors are always glad to have the opportunity of looking over a member's farm and offering such member any advice he may require during the time that the Instructor is in the district. By having the Instructor on the holding, he is in a much better position to advise the farmer, as he can more readily ascertain the exact nature of the difficulty and the circumstances contributing thereto. A visit of this nature is most interesting, and that apart from any actual trouble that the farmer may wish to discuss, he will find a general talk on his farm with the Instructor very beneficial. Our Branch has had some very interesting addresses delivered at our meetings by the Department's Instructors. The Department is at all times ever ready to assist members in any way possible. A letter addressed to the Department will be attended to promptly and a complete answer given to the queries contained in same. The Department is also prepared to analyse, free of charge, samples of water and soil and ascertain the proportions of chemicals, &c., contained in them. Although, as mentioned previously, the Bureau section is what interests us most, we must remember that the Department is in charge of a tremendous amount of work in the way of experiments and research work, and on which the value of the Bureau is really based. The Department has under its control two experimental farms—one in the South-East and Lower North, and experimental orchards at Blackwood and Berri. In a further endeavor to ascertain the individual requirements of various parts of the State, the Department has established demonstration and experimental plots in various centres on private farms in association with the local Branches of the Agricultural Bureau. These plots, whilst proving which grasses and cereals are most suitable for the particular district in which they are located, are also used for superphosphate experiments, and are of considerable benefit to farmers in these districts where they are situated. Roseworthy College and the Waite Research Institute are closely allied to the Department. In Roseworthy College an opportunity is afforded to the students to gain an insight into the practical side of agriculture, and farmers' sons on leaving school have the chance of studying whichever branch of primary production it should be their intention of pursuing later in life. A Winter School is conducted at the College each year for a short period, and an invitation is extended to anyone engaged in agricultural pursuits to attend, members of Agricultural Bureaux having preference. Besides the instruction section, the College does a lot of experimental work with the breeding of new wheats, the breeding of lambs suitable for export, and the State owes a good deal of its success in farming to the College. A number of competitions are conducted by the Department each year throughout the State, and they now comprise such competitions as fallow, crop, seed wheat, improved pasture, farm, and pruning. Valuable prizes are presented to the Department by manufacturers, vignerons, and others interested in the welfare of the competitions, and, although it is not many years since they were first started, they have become very popular and are well contested. Several field trials are conducted each year, at which farmers are given the opportunity of comparing the various farm machinery at work under local conditions. The Department is indebted to the machinery warehouses for the interest they take in these trials, as they are often involved in considerable expense in making available their machinery. A number of Branches of the Women's Bureau have been formed during recent years. The first one



was established at Riverton in 1917, and since then similar Branches have been formed at Saddledworth, Williamstown, Kalangadoo, Millicent, Pinnaroo, Wilkawatt, Kangarilla, Wasleys, Belalie, Gladstone, Auburn, Goode, Eureka, Millicent, Nelshaby, Parrakie, Wirrilla, Parilla, Parilla Well, and Warcowie. These Branches are conducted on similar lines to those of the men, and have been found a very advantageous introduction. Another important section of the Department is the Library and that dealing with the issuing of literature and the *Journal of Agriculture*. The Library is available to members in search of some particular information, and with a view of bringing that portion into closer touch with the farmer, a number of Branches have started libraries of their own. A number of bulletins are available from the Department, and a list of them will be found on the back of any *Journal of Agriculture*. A member requiring information on a special subject would be well advised to obtain one dealing with the particular matter in which he is interested. The *Journal of Agriculture* contains much useful information, and a half-hour can be spent very profitably in reading it through.

The officers of the Department are in constant touch with similar organisations in the other States and in various parts of the world, and is regularly receiving valuable information from those sources. The Department of Agriculture in Victoria recently introduced the Better Farming Train system into its activities, and our State was particularly fortunate in being granted the use of the train for a short period. A very large number of farmers availed themselves of the opportunity to visit the train during its limited stay, and a great deal of interest was evinced by them in the various exhibits and lectures. The fact occurred to me how desirable it would be if such a train could be made a permanent institution and a visit made to the whole of the agricultural areas of the Commonwealth. Unfortunately, on account of the variety of railway gauges with which our country is beset, that is practically impossible. Australia is mainly dependent on her primary products, and it is unfortunate that only a small proportion of the population is engaged directly in rural pursuits—the proportion in this State being about 10 per cent. of the total population. On account of this fact the primary producer is at a very serious disadvantage, since in all things, Government and otherwise, the majority rules. It seems to me that the man on the land is not always regarded in the kindly light that he is at such times as we are now passing through, when people more than ever realise what an important part he plays in the national welfare of our country. I trust that not only now, but also when good times come again, the primary producers will receive the utmost consideration and encouragement that they undoubtedly deserve and which it is their right to expect. It is through the Department of Agriculture that we must look for a helping hand, and it will be through the recommendations of the Advisory Board of Agriculture that our requests and requirements will receive the most respect. We do not only need the assistance necessary for increasing our returns, but also the means of remedying those influences that are operating against the primary producer, and are preventing the business of primary production being carried on profitably. The low prices ruling for our marketable produce would not affect us so adversely if it were within our power to regulate the costs of production accordingly. With the Advisory Board of Agriculture and the Department of Agriculture there is a connection from the farmer to the Government in matters of legislation due to his membership of the Bureau. In this connection, the District Conferences of the Agricultural Bureaux and the Annual Congress, which is held in Adelaide, are valuable as a means of passing resolutions for the improvement of legislation affecting the man on the land. One of the main objects of the Agricultural Bureau system is to forge a connection between the Department of Agriculture and the primary producers, whereby the latter can be informed of the results of the Department's activities. Another advantage of the Bureau system is the social side. It is of considerable value in that respect, for by meeting each month, the residents of a district are brought together and given an opportunity to exchange ideas and discuss matters of local interest. Our Branch was started in 1922, and I feel sure has been of very great assistance to those connected with it. I sincerely trust that it will continue to progress and that the ensuing year will be a very successful one.

Meeting held December 8th. Present: 13 members, two visitors. Mr. R. Tavener read a paper dealing with a trip to the Marrickville (New South Wales) Woollen Mills. Nine members were present at the meeting held on January 12th, which took the form of a Question Box. To poison boxthorn, Mr. Shipway was advised to use a solution consisting of 1lb. of arsenic to 10galls. of water. (Secretary, Mr. D. Gordon.)

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

November 4th.—Present: Seven members and two visitors.

PIGS.—Mr. B. Wheaton read the following paper:—"Pig raising on the Island is a side line that should receive more attention than it has in the past. The food can all be easily grown on the farms, and if carefully attended the pigs should show a good profit over a number of years. The prices received for pigs—as with any other



stock or produce—will vary, so that it is necessary to compare high and low prices. The successful pig breeder is the man who sticks to his job, and although he will experience times when profits are small, it is safe to assume that prices will rise again. While I have found the Mid-York to give good results, the question of breed is one of opinion, but if pigs for export are to be successfully raised, more consideration will have to be given to the breed that suits the market where the bacon is sold. As the distance from the market has to be considered, it is most profitable to market pigs from the Island as prime baconers, weighing 120lbs. to 140lbs. dressed. It is not advisable for a beginner to start with too many pigs. One or two sows for a start, and if they are good ones, the sows from them can be kept as breeders, but it will be found that, unless a lot of milk is available, four sows are enough for a farm. Having selected the sows and boar—which should always be a pure-bred one—they can be mated at about eight months old. A sow will rear two litters a year. Care should be taken that breeding is arranged so that they do not farrow in the hot months of summer or the cold wet of winter. The question of sties has to be considered, and while makeshifts can be used to start, the sooner one gets good sties with a good floor, so that they can be easily cleaned out every morning, the sooner will a bigger profit be shown. There will be less losses at birth, the general health of the pigs will be better, and the stock easier to handle. About four sties are necessary for farrowing and topping up pigs for market. There should be two compartments—the inside, which is roofed and is used for a bed, should have a rail all round about 7in. from wall and floor to prevent the sows lying on the young pigs, and the outside portion for feeding. If built of stone or concrete, a concrete trough can be cheaply built in. Besides the sties it is necessary to have a few small paddocks of  $\frac{1}{2}$  acre to 1 acre with a shelter in each. These can be sown for greenfeed, or after they have been used for pigs for some time, will grow quite a lot of grass. Naturally, the pig is a grazing animal, and a good supply of greenfeed that can be grazed is a good help for the boar and sows, and the young pigs after they are weaned and until they are shut up to fatten. There is no animal that turns its food into a saleable carcass so rapidly or efficiently as the pig, and while 4lbs. of barley to 1gall. of skim milk makes an ideal ration, other foodstuffs can be made use of. It is for the individual farmer to use the material he has or which he considers he can most economically provide. I consider barley the cheapest food that can be grown, with oats and peas when they are available. The sows and boar can be kept in a small paddock most of the year, and besides grass and plenty of water—which should be available to pigs at all times—I consider sheaved barley the best other feed for them, with oats for a change. They eat some of the straw and always have bedding. Sows should be brought in to the sty a week before farrowing and fed on swill—milk and soaked barley. Give the sow a bedding of straw, but do not have a lot in the sty at farrowing time, and it should be short. A sow can rear eight pigs comfortably, but if more than nine she will need a little extra attention, with the best food should rear a good, even litter. At four or five weeks the young boars should be castrated and weaned when about seven weeks old. At four or five weeks the young pigs will start to eat, and can be given a little crushed barley and skim milk where the sow cannot get it. At weaning time turn the sow out and leave the little pigs in the sty for two or three weeks longer. They should be well fed, but should not be given more than they will clean up. If any food is left remove it before putting in a fresh feed. Before turning out the sow, give her an oiling with waste oil. If it is put along the back it will soon run down over her body. This keeps the skin clean and free from scale and vermin. The young pigs should also be oiled before they are put out in the small paddock from the sty. If there is green grass or other greenfeed available, the pigs will not need so much grain to keep them growing well. It is at this time that one can force the pigs or just keep them going so as to market when at the most opportune time. No doubt crushed grain is better, but pigs do well on soaked, and saves the expense of crushing. A certain amount of crushed corn is much better while the pigs are small. Where there is not enough milk, meat meal occasionally is necessary. Wallabies or kangaroos boiled, and, when cooked, added to the barley make a good feed. A little bone meal mixed in with the feed is a help. Charcoal and any ashes available should be put in the pigs' yards. When the pigs are grown—fit to top up—they should be brought into the sties. Do not put too many together in a pen—three or four is sufficient. If you have more than the pens will hold at once, pick out the biggest and get them off to market and then bring in the seconds. As soon as they are penned spray them with milk oil fluid to get them clean, and repeat this about twice—the last spraying a day or two before sending to market. An orchard spray is a good thing for this. When fattening give as much feed as they will clean up. Brand the pigs with a letter by painting after first cutting the hair where the letter will be. Always send pigs to market as a good even line, so that of, say, 12 pigs, they will only need to be divided into two lots at the most for sale. Quality is the main factor to aim at. Always see that the pigs are in prime condition before marketing. There is room for a good deal of co-operation by two or more pig raisers who own three or four



sows. If they agree on the breed, one boar would do for both. They could also market together, so that a full load could be taken in, and also be a full load for a carrier at Port Adelaide. In conclusion, do not show a lad the pigs and the feed and expect, without any further attention, to find prime pigs ready for market in a few months time. Pigs deteriorate quicker than any other animal, and the owner needs to see them often, and if not doing well, remedy the fault. Healthy stock bred and kept in clean, warm, healthy sties, and fed regularly will give regular and rapid increase in value, brought about as economically as possible. If this cannot be done, do not keep pigs." (Secretary, Mr. J. Wood.)

#### MOUNT PLEASANT (Average annual rainfall, 27.29in.).

December 5th.—Present: Eight members and 27 visitors.

**BUSH FIRES.**—The following are extracts of an address delivered by Mr. Geo. Warren, of Mount Crawford:—Everyone should have some appliance to combat fires. When a fire is put out, make certain it cannot break out again. It should be the duty and in the interest of every good citizen (not only landholders) to prevent fires. The public should be educated to the dangers of bush fires and to take precautions. In Mount Crawford district, steel fireplaces are erected on picnic grounds, where warnings are posted up. On Saturday afternoons, Sundays, and holidays voluntary patrols are engaged, who have power to enforce the Bush Fires Act. Round-shouldered clear glass bottles can cause a fire, so should be destroyed. Helpers should be directed where to go. Make sure everything is out on the night of the fire. Mr. Davey then spoke to the meeting about knapsack spray pumps: he urged everyone who possibly could to possess one, which would greatly minimise the risk of fires spreading. (Secretary, Mr. D. S. Smith.)

#### PORT ELLIOT (Average annual rainfall, 20.02in.).

The monthly meeting was held on November 21st at Mr. A. M. Fuller's property, at Inman Valley, and was attended by 19 members, together with members from Inman Valley and Rapid Bay Branches, Messrs. R. C. Scott and R. Hill, of the Department of Agriculture, and C. A. Goddard (Wool Instructor, School of Mines). The meeting took the form of an inspection of the experimental plots of Mr. Fuller's property.

February 21st.—Present: 16 members.

**DRIED FRUITS.**—In the course of an address on this subject, Mr. J. Foot emphasised the value of dried fruit in the home, both from an economical and a health standpoint. Nearly all farmers had fruit trees of some kind, and any outlay that was made so that the fruit could be dried would be well repaid. Only the best quality should be used and in the best condition. If possible, trays should never be made of iron or bags; the most convenient size was about 4ft. x 2ft. Apricots should be sulphured for 10 to 12 hours, with about 1lb. of sulphur to about 60lbs. of fruit. Plums in many cases made just as good dried fruits as prunes. Use a hot caustic dip for these fruits (1lb. caustic soda to 10galls. boiling water), and leave the fruit in for 8 to 10 seconds, with a little longer if the fruit is green. Best results will be obtained with prunes if drying is started in the shade in a position so that the wind can blow through them, and finished in the sun. Put in a box and sweat for a month after drying. Treat peaches and nectarines the same as apricots. The quicker these are dried the better. Pears make excellent dried fruits and should be heavily sulphured (2lbs. sulphur to 60lbs. fruit for about 18 to 20 hours). They should be dried in the shade. Apples are not very successful to dry, and involve a good deal of trouble. Grapes make some of the finest dried fruit that can be obtained. They should be put in a caustic soda dip (1lb. to 10galls. of water) and dried in the sun. All fruits should be packed in a sweat box to finish off, so that all are equalised as regards moisture. As regards the fruit grub, if care is taken, the fruit not left lying about, and the boxes lined with grease-proof paper, no trouble should be experienced. After drying and sweating (apricots, pears, peaches, &c.) a dip of wattle gum prevents attacks of grubs. A glycerine and treacle dip can be used for all fruits. Mr. H. Parsons read a paper, "Lessons from 1930." (Secretary, Mr. A. Lowe, c/o Jacob & Russell, Pirie Street, Adelaide.)

#### RAPID BAY.

November 13th.—Present: 14 members.

**MAKING FARM LIFE ATTRACTIVE.**—Mr. R. Hooper read the following paper:—"It is essential to adopt a definite system of farm management. It is a good policy to allow the hired farm hands (or the sons, as the case may be) some interest in the farm. Cows are a sike line on most farms, and if the man looking after the cows is given a percentage of the cream cheque in addition to his wages, he will naturally endeavor to



obtain the best results. In the matter of the cows themselves, it pays a farmer to keep a good, well-bred herd. Purchase a good bull. Breeding your own stock becomes very interesting, and leads to taking a pride in the farm. If a farmer using horse teams cannot afford to purchase a stallion he should try to secure the services of a good type of stallion for his brood mares. The Clydesdale or Suffolk Punch breeds are good types for farm work. Care of the horses in a point of most importance. A good stable with a straw roof, being cool in summer and warm in winter, goes a long way towards keeping horses fit for work. Grooming is also an important factor in keeping horses fit. It takes time to give horses proper care and attention, but the only return they get for their work is their keep, so surely all fair-minded men, who are responsible for their care, should treat them well. In these times, when every item of expenditure calls for close scrutiny, it will pay farmers with horse teams to see that their harness sets receive the best care and preservative treatment to ensure that they last as long as possible. A point of first importance in harness treatment is systematic oiling and cleaning. Only animal or vegetable oils should be used. Neatsfoot oil, or half Neatsfoot and half tallow melted together and applied warm is suitable. Fish oil is also recommended. It is advisable to wipe sweat-marked harness thoroughly dry after a day's work. All machinery and implements should be kept clean and as up-to-date as possible, so that the work is easily and well done. During seeding and harvesting season a reliable man should be allowed to carry out his ploughing or drilling, reaping, or whatever he may be doing, in his own way, as if the farm was his own. He will be more interested and take a greater pride in his work if allowed this freedom."

A special meeting was held on November 26th. Mr. C. Goddard, of the School of Mines, delivered an address, "Sheep Management and Handling the Clip." (Secretary, Mr. L. Morris, Delamere.)

#### RAPID BAY.

February 12th.—Present: 11 members.

SOIL FERTILITY.—Mr. J. Muller read the following paper:—"The most common cause of infertility of soil is lack of humus, though there are quite a number of causes that have the effect of making soil infertile, such as lack of minerals that supply the plant food, or the soil may be in such a condition that plants cannot avail themselves of that food; or it may be too wet or too dry—each one of those causes would have the effect of plants not thriving. Yet the soil could only be classed as infertile. In most cases, the reason why soil is deficient in humus is that it has been depleted through constant cultivation, more especially where the wheat-fallow system has been adopted and no provision has been made to replenish the drain on the natural supply. If farmers would only study and adopt the laws of Nature, such a state of affairs would not be so marked as it is in some cases. Some soils also stand more abuse in that direction than others, but there is no excuse for abuse, more especially when it touches one's own pocket. The thing then is how to stop the depletion. There is no doubt that rotation of crops will go a long way towards solving that problem, because one kind of crop invariably leaves the soil in a better condition for another kind of crop. Unfortunately, in most districts the farmer has not a great variety of crops to choose from—at least, not what would turn out a profitable proposition, and that is, after all, the main governing factor. On the other hand, some districts, especially those with a good rainfall, have quite a number to choose from. Where peas do well, there is no crop to compare with it for keeping up the fertility of the soil, but the same thing applies to all the legumes, though perhaps not to such a great degree; but they all leave the soil in a good mechanical condition, and if that can be followed by a crop such as rape or swedes, that could be fed down with sheep, there is no doubt it would tend to increase, instead of diminish, the amount of humus. The gardener is in a more enviable position in that respect than the farmer, in that he has a greater variety of crops to choose from, but a lesson can be learned from that source. The method adopted by most gardeners is to follow a crop that grows above the ground by one that grows under the ground, such as root crops after potatoes and potatoes after peas or beans, &c. Lack of plant food is also a governing factor in infertility, or perhaps plant food in an unbalanced form or quantities. Unless the soil is waterlogged, it generally contains most of the minerals that are required; the exceptions are phosphates, nitrogen, potash, lime, and lately some soils have been found to be deficient in manganese. Every farmer knows that to grow crops phosphates are necessary, but there are quite a number that still ignore the other constituents which in some cases are just as necessary as phosphates. How often do we see a crop that has the yellow-green appearance that denotes the lack of nitrogen, but as nitrogen in the commercial form is often too expensive to use, the growing of a legume, such as peas or clover, is often quite possible. Rape also is a crop that can be grown in a number of instances and is highly recommended for fattening sheep, lambs, and pigs, the droppings of which, and the rotting of the roots, all help to increase the fertility of the soil. Rape is a member of the *Brassica* family, and thrives best where



nitrogen is more plentiful, so it is advisable to sow it after a crop of peas. It also has the advantage of cleaning the ground where peas have the tendency of making the ground dirty. Ploughing under green crops has a tendency to sour the soil, and requires sweetening afterwards, but it is very useful in replenishing the soil with humus. In the wetter districts of the State the soils are mostly more or less sour. This can be overcome by the application of a dressing of lime, but as lime is generally too expensive, fallowing or the growing of a leguminous crop is to be recommended where large areas are to be cultivated, though the difficulty can be overcome by the application of lime where the area is only small. In most of the Hills gardens sourness is never encountered, which is probably accounted for by the fact that most gardeners use large quantities of bone dust, which contains 40 per cent. water soluble phosphate, which is mostly lime. In our grass lands, maintaining soil fertility is a much simpler job, as we have the assistance of Nature more at our disposal than with our cultivated lands. All that is necessary is to top-dress the pastures with a manure or a mixture of manures suitable for the grasses or clovers, and in some cases to the soil and the climatic conditions. Conditions vary so much in different districts that it is advisable for every farmer to do a certain amount of experimenting, even if only in a small way." (Secretary, Mr. L. Morris, Delamere.)

#### SHOAL BAY.

November 4th.—Present: 11 members and four visitors.

Mr. Turner reported having logged down scrub on the site for the proposed pasture experiments. A report of the Annual Congress was given at the meeting held on October 7th. A formal meeting was held on December 2nd. (Secretary, Mr. H. Bell, Wisanger.)

BALHANNAH.—Mr. E. W. Mattner presided over an attendance of 19 members at the meeting held on February 27th. Mr. H. N. Wicks delivered an address, "The Home Flower Garden." The retiring Hon. Secretary (Mr. H. Spoehr) was presented with an E.P. cake dish in recognition of his services to the Branch. (Secretary, Mr. C. Grashy.)

#### Summary of Meetings, &c.

| Branch.        | Date of Meeting. | Members Present.   | Subject.                                                                | Secretary.                  |
|----------------|------------------|--------------------|-------------------------------------------------------------------------|-----------------------------|
| Mt. Compass    | 7/1/31           | 25                 | Addresses—"Forest Trees," Mr. C. Durward; "Forest Entomology," Campbell | J. Black                    |
| Mt. Compass    | 5/2/31           | 23                 | Annual Field Day. Address—"Gardening," Mr. M. Jacobs                    | J. Black                    |
| Ashbourne      | 18/2/31          | 12 and 25 visitors | Address by Mr. H. Alderson, B.V.Sc.                                     | H. Pitt                     |
| Nelshaby       | 29/1/31          | 9                  | Paper—"Retrospect and Harvest of 1930," Mr. C. Plenty                   | A. Laurie                   |
| Longwood       | 3/1/31           | 9                  | Homestead Meeting                                                       | J. R. Coles                 |
| Scott's Bottom | 3/1/31           | 6                  | Paper—"Pastures," Mr. A. Blakely                                        | E. Atkinson, Cherry Gardens |
| Scott's Bottom | 31/1/31          | 7                  | Discussion                                                              | E. Atkinson, Cherry Gardens |
| Tweedvale      | 12/12/30         | —                  | Debate—"Pines v. Apple Trees"                                           | B. Schapel                  |
| Cherry Gardens | 7/2/31           | 13 and 8 visitors  | Homestead Meeting                                                       | A. R. Stone                 |
| Kangarilla     | 12/2/31          | 31 and visitors    | Visit to F. H. Faulding's and S.A. Farmers' Union                       | T. Golder                   |
| Gumeracha      | 2/3/31           | 11                 | Paper—"Grading Fruit for Export," Mr. A. Cornish                        | L. Wise                     |



*Summary of Meetings, &c.—continued.*

| Branch.           | Date of Meeting. | Members Present.  | Subject.                                                                              | Secretary.                  |
|-------------------|------------------|-------------------|---------------------------------------------------------------------------------------|-----------------------------|
| Mt. Compass       | 5/3/31           | 43                | Address—Mr. W. J. Spafford                                                            | J. Black                    |
| Blackheath .      | 5/3/31           | 9                 | Paper from <i>Journal of Agriculture</i>                                              | E. Paech, Rockleigh         |
| Langhorne's Creek | 4/3/31           | 7                 | Question Box . . . . .                                                                | P. Nurse                    |
| Brinkley ...      | 4/3/31           | 17                | Harvest Reports . . . . .                                                             | C. Pearson                  |
| Currency Creek    | 9/2/31           | 12                | Discussion . . . . .                                                                  | D. Jeff. Gordon             |
| Currency Creek    | 19/3/31          | 13                | Address—"Mixed Farming," Mr. R. Hill                                                  | D. Jeff. Gordon             |
| Strathalbyn.      | 3/3/31           | —                 | Paper—"Problems of the Farmer," Mr. S. Pearce                                         | F. Allison                  |
| Strathalbyn.      | 3/2/31           | 18                | Address—"Merino Sheep," Hon. W. G. J. Mills, M.L.C.                                   | F. Allison                  |
| Millendilla ..    | 6/2/31           | 5                 | Harvest Reports . . . . .                                                             | V. Wegener                  |
| Millendilla ..    | 6/3/31           | 10                | Address by Mr. H. B. Barlow                                                           | V. Wegener                  |
| Milang . . . .    | 11/2/31          | 12                | Address—"Parturition," Mr. F. Cleggett, and paper, "Care of Farm Tools," Mr. R. Potts | J. Bagley                   |
| Shoal Bay ..      | 10/3/31          | 11                | Veterinary Medicine Chests                                                            | H. Bell, Wisanger           |
| Shoal Bay ..      | 31/3/31          | 10                | Address—"A Trip to the South-East," Mr. G. Turner                                     | H. Bell, Wisanger           |
| Langhorne's Creek | 1/4/31           | 17                | Address—"Pig Breeding," Mr. A. Poole                                                  | P. Nurse                    |
| Ashbourne .       | 27/3/31          | 14                | Address—"Experimental Plots," Mr. R. C. Scott                                         | H. Pitt                     |
| Currency Creek    | 9/4/31           | 14                | Address—"Home Projects," Mr. A. Edquist                                               | D. Gordon                   |
| Currency Creek    | 20/4/31          | —                 | Addresses by Officers of the Royal Automobile Association                             | D. Gordon                   |
| Mt. Barker ..     | 5/4/31           | —                 | Address—"The Pig Industry," Mr. R. Hill                                               | P. Wise                     |
| Langhorne's Creek | 20/4/31          | 15                | Address—"Stock Diseases," Mr. A. H. Robin, B.V.Sc.                                    | P. Nurse                    |
| Kangarilla .      | 6/3/31           | 10 and 8 visitors | Address—"Pig Breeding," Mr. A. Russell                                                | T. Golder                   |
| Scott's Bottom    | 28/2/31          | 9                 | Paper—"Honey," Mr. Thorpe                                                             | E. Atkinson, Cherry Gardens |
| Blackwood .       | 9/3/31           | 13                | Discussion . . . . .                                                                  | R. Quinn                    |
| Cherry Gardens    | 7/3/31           | 8                 | Visit to Blackwood Cool Stores                                                        | A. Stone                    |
| Mt. Pleasant      | 6/3/31           | 9                 | Discussion . . . . .                                                                  | D. Smith                    |
| Longwood ..       | 28/3/31          | 7                 | Homestead Meeting . . . .                                                             | J. Coles                    |
| Springton ..      | 4/2/31           | 15                | Harvest Reports . . . . .                                                             | E. Brokate                  |
| Springton ..      | 4/3/31           | 8                 | Question Box . . . . .                                                                | E. Brokate                  |
| Springton ..      | 1/4/31           | 10                | Paper—"The Blowfly Pest," Mr. J. Shearer                                              | E. Brokate                  |
| Balhannah .       | 27/3/31          | 16                | Address—"Tobacco," Mr. S. B. Opie                                                     | C. Grasby                   |
| Kangarilla .      | 10/4/31          | 10                | Paper—"Tobacco" . . . .                                                               | T. Golder                   |
| Cherry Gardens    | 4/4/31           | 12                | Homestead Meeting . . . .                                                             | A. Stone                    |
| Hartley . . . .   | 28/1/31          | 9                 | Harvest Reports . . . . .                                                             | D. Harvey                   |



# CROWN LANDS.

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## LANDS TO BE OFFERED SHORTLY.

Lands in the Hundreds of BENARA, COMAUM, GAMBIER, JESSIE, JOANNA, KONGORONG, LAKE GEORGE, MAYURRA, McDONNELL, MOUNT BENSON, NARACORTE, RIVOLI BAY, STIRLING, SYMON, and WATERHOUSE.

When offered full particulars will be published in the *Government Gazette*, and plans and detail may be obtained on application to the Director of Lands, Adelaide.

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## LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Box 293A, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

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## ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.



## AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned :—

"First Aid to the Horse," by F. E. Place, B.V.Sc., M.R.C.V.S., &c. ; price, 3s. ; posted, 3s. 2d.

Journal of the Department of Agriculture, 5s. per annum in advance ; 1s. per single copy to residents in South Australia. Other places, 10s. per annum ; single copies, 2s. each.

The bulletins and leaflets may be obtained by sending a 1d. stamp for postage.

All communications must be addressed—Ed., "Journal of Agriculture," Box 901E, G.P.O., Adelaide.

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**THE AGRICULTURAL BUREAU.**—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.



# **CLOVER TROUBLES**

## **in PASTURES.**

Mr. R. Crowe, Export Superintendent of the Department of Agriculture, Victoria, emphasises the bad effect of excess clover on the keeping qualities of milk, cream, and butter in an article on "Butter Factory Management," extracts of which are published in the *Victorian Journal of Agriculture* for August, 1930. For those dairymen and lamb raisers who encounter bloat and kidney disease in stock and "clover taint" in milk it is essential to obtain more grass in proportion to clover in their pastures. Autumn is the best time to rectify the trouble, and the following system should prove satisfactory :

- 1.—Autumn Harrowing and Reseeding with Wimmera rye grass in low rainfall areas and perennial rye and cocksfoot under moister conditions.
- 2.—Application of Sulphate of Ammonia.  $1\frac{1}{2}$  cwt. per acre in April or May after soil has been well saturated by Autumn rains.
- 3.—July Application of Sulphate of Ammonia 1 to  $1\frac{1}{2}$  cwt. per acre. In addition to improving the grass-clover balance the use of sulphate of ammonia will provide valuable grass growth during the Winter and early Spring months.

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For further particulars apply—

ADVISORY OFFICER,  
**NITROGEN FERTILISERS PTY. LTD.,**  
360, COLLINS STREET, MELBOURNE, C.I.



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JUNE 15, 1931.

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**All communications to be addressed:**

**“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”**

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S. E. WHITFORD.

*Minister of Agriculture.*



## AGRICULTURAL VIEWS AND COMMENTS.

### MISCELLANEOUS.

#### Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

Far West Coast, at Ceduna, July 1st (Mr. E. H. Fear, Secretary).

Upper North, at Willowie, July 15th (Mr. H. A. Crisp, Secretary).

The above Conferences will commence at 10.30 a.m. in each case. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

#### World Production.

In a communication early this month the Secretary of the Department of Markets furnished us with the following particulars relating to the production of primary products:—

| Article.              | World Production (Latest Figures Obtainable). | Australian Production.                                      |
|-----------------------|-----------------------------------------------|-------------------------------------------------------------|
| Wool .....            | 3,748,310,000lbs.                             | 875,000,000lbs. (1930-31)                                   |
| Wheat .....           | 3,687,710,000bush.                            | 213,265,650bush. (1930-31)                                  |
| Flour .....           | Not available                                 | 1,130,760 tons (1929-30)                                    |
| Barley .....          | 1,392,986,000bush.                            | 7,588,852bush. (1929-30)                                    |
| Beans and Peas .....  | Not available                                 | 812,760bush. (1929-30)                                      |
| Maize .....           | 2,778,554,000bush.                            | 7,946,320bush. (1929-30)                                    |
| Oats .....            | 2,915,115,000bush.                            | 14,424,186bush. (1929-30)                                   |
| <i>Dried Fruits—</i>  |                                               |                                                             |
| Currants .....        | Not available                                 | 15,460 tons (1930-31)                                       |
| Sultanas .....        | Not available                                 | 25,334 tons (1930-31)                                       |
| Lexias .....          | Not available                                 | 5,200 tons (1930-31)                                        |
| <i>Canned Fruits—</i> |                                               |                                                             |
| Apricots .....        | Not available                                 | 183,076doz. 30-oz. tins                                     |
| Peaches .....         | Not available                                 | 1,367,591doz. 30-oz. tins                                   |
| Pears .....           | Not available                                 | 205,733doz. 30-oz tins                                      |
| Pineapples .....      | Not available                                 | 140,000doz. 30-oz. tins<br>(Summer pack)                    |
| Wine .....            | 4,100,000,000galls. (1929)                    | 15,900,000galls. (1930)<br>13,000,000galls. (1931 estimate) |

#### The Canning Industry and the English Market.

Referring to the opening of a new canning factory at Worcester, England, the Minister for Markets, when questioned recently, stated that while Great Britain had made rapid strides in the last five years in the development of local canning of fruits and vegetables, it was not anticipated that such development would materially affect Australian exports of canned fruits, although Tasmania may be slightly affected in regard to berry fruits. Australia's principal exports in canned fruits were peaches, pears, apricots, and, to a lesser degree, pineapples—fruits with which Great Britain was not able to compete. Great Britain's activities were principally directed to the canning of plums, cherries, and berry fruits such as strawberries, raspberries, loganberries, gooseberries, and black currants, and in the vegetable line principally peas, but also beans, asparagus, carrots, and new potatoes. For these products the English climate was particularly favorable. The excellent flavor for which English fruits are renowned was a great asset. The development of the local canning industry has undoubtedly filled a great want in securing for home-grown products continuity of supplies throughout the year and the prevention of seasonal gluts. In the pea-canning section of the industry marked success had been achieved, resulting in largely increased sowings. It has been



stated that the demand has been extraordinary, and that last year the pack was double that of 1929. Success had been achieved through the greater recognition, by the English public, of the excellence of the home-grown product and its distinctive appeal to the palate, the attention paid to high class quality and perfecting processes, and the increased facilities for scientific canning on a commercial scale. One development has been the use of the leading packers of the gold lacquered container, with the sales advantage of a pleasing bright gold interior reflecting the natural color of the contents. Another factor in the development of the industry has been the crusade carried out by the Empire Marketing Board and the Ministry of Agriculture, and the introduction of a national mark for English canned goods. Movements are, it is reported, now afoot to standardise sizes of containers, and all aspects of the industry are being tackled with thoroughness to ensure the retention of the Home market and open the way for extension of trade to foreign countries.

#### **Publications Received.**

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

Report of the Proceedings of the Imperial Wool Research Conference, 1930. Price 1s. net.

Report of the Federal Dairy Investigation Committee, Part I.—Farm Production.

---

### **AGRICULTURAL INQUIRIES.**

---

[Reply supplied by PROF. A. J. PERKINS, Director of Agriculture.]

---

#### **Mixing Super with Guano.**

*"Is it advisable to mix super and guano and sow them together at seeding time?"* ("W. A. S.," Lake Wangary.) Reply—The composition of guano is exceedingly varied, even in the same deposits, and therefore it is impossible to express an opinion on the value of the particular type of guano you propose using. In the circumstances, the practice I would recommend would be as follows:—

Drill the guano in before seeding, even as early as February or March, if found convenient, and drill in the wheat with the superphosphate as usual. The main reason for this practice would be that young wheat plants require to come almost immediately under the stimulating influence of readily soluble phosphoric acid, which they find in superphosphate. The phosphate present in guano is not water soluble, and therefore would not be so readily available to the young wheat plants. Guano super is guano treated with sulphuric acid in the same way as phosphatic rock is treated in the manufacture of superphosphate.

Some guanos contain appreciable quantities of nitrogen, which in certain circumstances may prove of advantage to the crop, although heavy quantities of nitrogen generally lead to rank late ripening crops which are very much likely to be blighted off in unfavorable seasons.

---

[Replies by MR. W. J. SPAFFORD, Deputy Director of Agriculture.]

---

#### **Feeding Off a Growing Crop.**

*"At what stage should sheep be first turned on the crop?"* (Blackheath Agricultural Bureau). Reply—The general experience of the cereal-growing districts of South Australia is that crops should not be fed-off by sheep unless they are making excessively luxuriant growth in the early stages. In those few districts in the State where the cereal crops grow so rankly that they lodge when only 6in. to 8in. in height, it is the



usual practice to feed the crop close to the ground, but in other cases harm is generally done by allowing livestock on to the crop. If sheep are to be put on the crop it should be done as soon as the plants lodge, provided the soil is not too wet at that time. The crop being grazed should be fed off as rapidly as possible, and the sheep be removed as soon as the land is bared. A relatively large number of sheep should always be used, otherwise the animals pick out the weaker patches and shorter growth, and leave the over-rank places which would benefit from being fed off. Except in the case of excessive rankness of the young crop when benefit follows grazing off, the grain yield of practically all crops is reduced by feeding them down. In most of our wheat-growing districts on no account should stock be allowed on cereal crops after mid-July.

#### **Strawberry Clover on Swamp Land.**

*"Would Strawberry Clover do well on a swamp near Mannum still in its natural state, and how can the clover be established?"* ("G. H. M.," Mannum.) Reply—The two essential requirements for strawberry clover to make full growth, are (1) plenty of organic matter in the soil, and (2) perpetual dampness or even wetness, to the extent of water a few inches in depth. If your swamp is similar to so many of the small swamps on that part of the River Murray, this clover should give very high returns of first-class fodder for dairy cows. The best way to establish the strawberry clover in wet locations is by rooted sections or by sods. If you seed down a small area in a plot which can be watered, plants or sods can be put out in the swamp. If possible to walk on the swamp, rooted sections of old plants, or seedlings, can be transplanted, but if unsafe to walk on the mud, small sods from 1in. to 2in. square can be cut from the seedbeds and be thrown into the mud. The seed can be sown any time in the year in seedbeds, but as many samples of seed are rather poor germinators, all seed should be treated before sowing. If a sheet of rather fine sandpaper is tacked on to a board, the seed can be scarified by spreading it in a thin layer on a table or floor and gently rubbing it with the sandpaper. Just enough pressure should be used to scratch the surface of the seeds without crushing them. Once the seeds have germinated, the plot should receive plenty of water, as this clover is a water-lover.

#### **Oats for Hay and Greenfeed.**

*"What is the best variety of oats to sow for hay in a Hills district with about 35ins. of rainfall, best time to sow the crop, and what is the best variety for greenfeed?"* ("J. R.," Longwood.) Reply—Of the oat varieties suitable for hay and usually obtainable in this State, the order of preference for your district would be Sunrise, Algerian, and Lachlan. Sunrise requires the use of a little more seed than the other sorts, and the seeding should consist of about 70lb. to 80lb. per acre; whereas for the other two kinds, about 60lb. to 70lb. should be sufficient. Oats require plenty of time to mature if the crop is to give full returns, so the seed should be sown early in autumn, when rains have been sufficiently heavy to bring about a germination of seed. In your district late April would be best seeding time, but good results should follow seeding during the month of May. Best results would probably be secured from Early Burt, Bathurst Early, or Lachlan. When seeding oats for greenfeed, plenty of seed should be used, say 80lb. to 100lb. per acre. In your district a greater cut of winter greenfeed would be secured if a mixture of 40lb. oats and 30lb. rye was sown instead of oats alone.

#### **Lucerne Flea.**

*"The lucerne flea is doing a good deal of damage in this district. Is it likely that lime can be successfully used as an insecticide for this pest?"* ("A. N. W.," Woodside.) Reply—Lucerne flea is much more prevalent than is usual at this time of the year, and has done considerable damage to leguminous crops in many parts of the State; till it will be surprising if it affects spring growth of Subterranean Clover to any great extent. We know of no case where lime in any form has been used successfully to



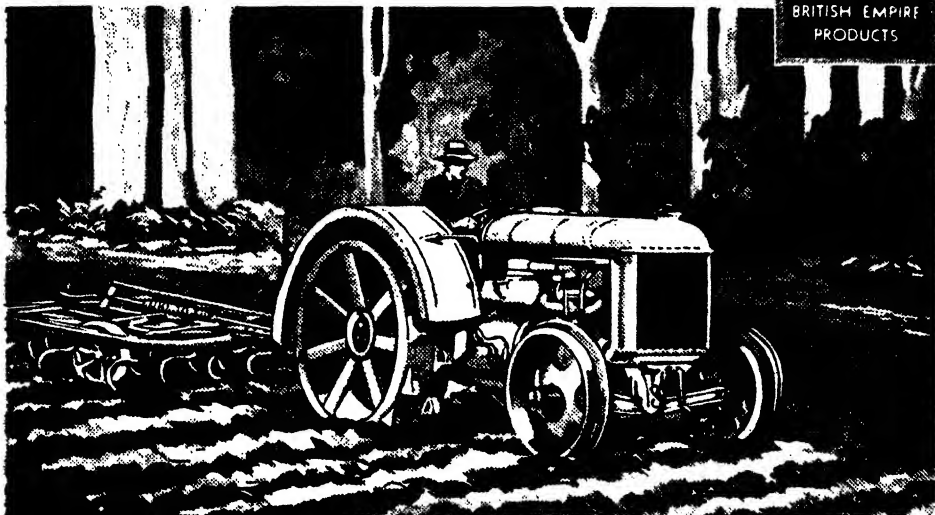
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control this pest, but on the favorable results secured by the use of lime-sulphur, we would suggest that you try this material. Lime-sulphur is sold by all suppliers of gardeners' requisites, and the commercial solution should be mixed with 50galls. of water and sprayed on the short pasture at the rate of from 70galls. to 90galls. per acre. The liquid is non-poisonous, and livestock can be returned to the fields a few hours after doing the spraying. If you intend to try lime it should be in the form of slaked lime when applied, as most forms of agricultural lime will be ineffective as insecticides. It will probably take 3cwts. to 4cwts. of ordinary slaked lime to give the pasture a sufficient sprinkling to have a chance of destroying the insects, and such a dressing would be beneficial to the soil. The slaked lime can be applied at any time during the day, and as soon as the slaking has been completed, without injury to the plants. Lime would benefit the soils of the Woodside district for general cropping purposes, but is not necessary for Subterranean Clover, this particular crop only requiring liberal applications of phosphatic manures. If lime is to be applied to improve the soil, the application should be from 10cwts. to 1 ton of slaked lime per acre, broadcasted on the land after it has been ploughed and cultivated, and then be only harrowed into the surface soil.

#### Reverse Clover.

"Can the Department of Agriculture give any information concerning a clover known as Reverse Clover in Western Australia?" ("H. P. B.," Birdwood). Reply—This clover is known in Western Australia as Drooping-flowered Clover (*Trifolium cernuum*). A leaflet issued by the Western Australian Department of Agriculture says that Drooping-flowered Clover prefers moist or even wet soils, and will withstand inundation in the winter months, but in drier soils it is not as successful as Subterranean Clover. The clover is readily eaten by stock. Messrs. Goldsbrough, Mort & Co., Limited, Melbourne, advertise seed at 7s. 6d. per lb.

#### Linseed Growing.

Correspondents seeking information on the cultivation of linseed in South Australia have been advised by Mr. W. J. Spafford (Deputy Director of Agriculture) that although linseed has been tried at various times and in all of the better agricultural districts of the State, it has never proved sufficiently profitable for farmers to continue with the crop. As a matter of fact, no linseed whatever has been grown here since 1920.

*Soils Suitable.*—The crop requires very fertile soil, and in all probability such soils as the chocolate-colored ones of the Adelaide Hills and the drained lands and volcanic soils of the South-East would grow the crop well if other conditions were favorable.

*Rainfall Required.*—If the average annual rainfall is not somewhere about 30ins., irrigation will be required.

*Class of Manure Suitable.*—The manures required will depend on the rotation of crops being practised. Where the land is spelled from crops fairly frequently, 2cwts. of superphosphate per acre would be sufficient, but under fairly intense culture 1cwt. sulphate of ammonia per acre should also be used.

*General Cultivation, &c.*—The cultivation of the land must be very thorough, and particularly so as regards the control of weeds. Clean land is of the utmost importance, and difficulty is experienced in this connection, because the crop should be sown fairly early to give it sufficient time to mature properly. In a general way it may be said that the crop is grown in a similar manner to the cereals, using from 1bush. to 1½bush. of seed per acre. It has, however, a disadvantage not common to the cereal crops in that the boll-worm appears to be very partial to the seeds, and when present will ruin the crop.

*Can it be Grown Within One Mile of the Coast?*—The coastal influence does not appear to retard the growth of the crop.

*Approximate Yield per Acre?*—Varies between very wide limits in this State, from very low yields to as high as 20bush. per acre. This liability to vary so much seems to be one of the principal causes of the unpopularity of the crop.



*Yearly Output for South Australia:*—No linseed has been grown in South Australia since the year 1920.

*Yearly Importation from Overseas?*—We import from India about 5,000,000lb. of linseed annually, about 18,000galls. of linseed oil, and about 30,000lbs. of linseed cake. Much of the oil extracted in South Australia is exported to Western Australia.

## HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. GEO. QUINN, Chief Horticultural Instructor.]

### Black Apricots.

*"What is the cause of 'black' apricots found on the trays after the fruit has been sulphured?"* (Rameo Branch of the Agricultural Bureau.) Reply—As far as I am aware the subject of the appearance of "black" apricots on trays has never been closely investigated. It has been assumed that they are the product of fruits which, for some reason, have not developed to the normal stage of ripeness, though seemingly so when passing the preparatory stages of drying. It is well known that apricots in which the starch has not changed into sugar will not readily respond to the sulphuring process which fixes the color in normally ripened fruits. Again, apricots or other fruits in which over-ripeness induces a return to acidity may re-act in a similar manner.

### Lemon Tree—Shedding Fruits.

*"Will the Department explain the cause of and suggest treatment for a lemon tree, the fruit of which, after it reaches fair size, drops off?"* ("H. D. S.," Bowhill.) Reply—The dropping of the young lemon fruits is probably due to an irregular supply of moisture about the roots of the tree. Lack of nutrition is also a possible cause, and exposure to cold winds also may contribute. I suggest watering the tree systematically, and giving an occasional dressing of sulphate of ammonia, dissolved in with the irrigation—using not more than 1lb. per annum for each year of age of the tree, assuming it has grown well.

### Planting Hardshell Almonds.

*"What are the best hardshelled almonds and what is the best method of planting?"* (Springton Agricultural Bureau.) Reply—There are scarcely any named sorts (other than the true Jordan variety) of hardshell almonds grown here. The almond varieties have apparently been crossed so much that there is no certainty whatever that the progeny from sweet-kernelled nuts will produce almonds with sweet or bitter kernels or

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hard, soft, or paper soft shells. Any kind of hardshelled almond would do for planting. The best plan when planting *in situ* is to prepare holes—20ft. apart on the square system—by breaking the land to a depth of, say, 18in. at least and planting three nuts, say, 6in. apart in triangular order about a stake. Put them 2in. under the surface in early winter, if possible, whilst the soil is still warm. If several trees grow, the surplus plants may be transplanted at the second winter to fill any gaps.

#### Citrus Growing in Southern Districts.

Mr. C. H. Beaumont (District Horticultural Instructor) has informed a correspondent that citrus trees are grown in the Southern District mainly in two localities—Langhorne's Creek and Inman Valley (with Hindmarsh River)—the first with light rainfall (15in.) and irrigated, the other with heavier rainfall (26in.) and not irrigated (with one exception). In the irrigated section the soil is most varied, being from sand to heavy black loam, and formed by the overflow of the Bremer River; the water supply for the trees depends on the overflow of this river, so that it is irregular. Trees generally do well, even though they have many set backs, especially through lack of water when most needed. In the non-irrigated area the soil also varies, being made up by the overflow of the Inman and the Hindmarsh, but is mostly from good sandy to heavy black loam. The irrigated section has no very serious diseases, black scale being the worst insect pest and collar rot and brown rot the worst fungus pests. Red scale has started in one or two plantations in the Inman district, otherwise pests are the same as at Langhorne's Creek. Insect pests are controlled mainly by white oil sprays or by fumigation with hydrocyanic acid gas, generated by wet or dry methods; fungus pests are controlled by pruning and by the use of Bordeaux mixture. The groves are usually ploughed in September or October and are kept clean through the summer by cultivation, but in winter, either a cover crop of peas is grown or weeds allowed to grow, to be finally ploughed in as green manure. Trees are fertilised with sulphate of ammonia, 2lbs. to 4lbs. per tree at time of ploughing, but if peas are used then 2cwt. of 45 per cent. super per acre are sown with them. Any pruning is carried out about May and June, and consists mainly of removing excess twigs and dead wood, and keeping limbs up from the ground, the idea being to have the tree fairly open and of good shape. Picking of fruit commences in the irrigated section about July-August and finishes about November, and in the non-irrigated area starts about October and ends in December-January. The fruit generally is sweet and juicy and of good size, but at times is thick skinned; it is sized and packed by the owner growers for the local and city markets. The orange mainly grown is the Washington Navel, though there are a number of seeded varieties still grown, and Valencia Late is on trial. Lemons are not grown extensively, and the Lisbon is the most favored. Hailstorms are a trouble, and at times the skin of the fruit is severely damaged, but on the whole climatic conditions are good, and are suitable for the production of good fruit. Holdings vary from 50 to 10,000 trees, and the trees bear well.

#### VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"A. S. D.," Kilkerran, reports two horses lame in front legs. Swollen above hoof and discharging matter. A split has appeared across the front of the hoof. Reply—The following treatment is advised:—Search out sole carefully below where the breaking-out first took place. The condition points to a puncture in that part. If present, open up, foment daily, dress with pure lysol and keep clean. In any case foment foot for two or three days, then open out the fissure or crack and dress with strong tincture of iodine. Subsequently cover with the following dressing:—Lard, 1 part; turpentine oil, 1 part; beeswax, 1 part. Further, rub the following blister into coronet above crack every third day or so:—Cantharides blister (1 in 24 of lard), to be obtained from chemist.



"*L. T. M.,*" *Delamere, reports heifer on first calf going dry over night. Milk thick and discolored. Slight falling off in condition. Reply—*The heifer probably has a subacute mammitis (inflammation of the udder). Give a drench of 1lb. of Epsom salts, and subsequently give 1 teaspoonful of powdered nux vomica (mixed with treacle and smeared on the tongue) night and morning for 10 days. Three times daily massage the udder for 10 to 15 minutes with warm camphorated oil, and if one quarter is weaker than the others, strip it out five to six times during the day.

"*H. W. C.,*" *Stansbury, asks if syringing a cow with Condy's would have the effect of not being able to again get her in calf. Reply—*No, provided it was not done within a day or two before the service. The cow has probably a chronic metritis.

"*Mrs. M. A. C.,*" *Parrakie, reports cow with eruption on udder. Teats and udder are blistering and of a dark-purple color. Reply—*After each milking bathe the skin of udder and teats with warm water to which has been added a little lysol. Dry gently after this bathing, and then smear over lightly with some 5 per cent. carbolic vaseline or zinc ointment. If healing is tardy, a few drops of Friar's Balsam may be incorporated into the ointment used. It would also be advisable at the commencement of treatment to give the cow a purgative dose of medicine—*e.g.*, Epsom salts, 1lb.; molasses, ½lb. to 1lb.; ground ginger, 2ozs.; warm water, 1 quart. Mix these all together and give as a drench.

"*E. H. C.,*" *Meribah, reports young sows, after having had a litter, lose use of hindquarters. Reply—*The condition in your sows is a *post-partum* paralysis. Young sows used for breeding purposes should not be too fat, and should have plenty of exercise. Green feed, and especially lucerne, during the summer should be supplied to them when possible. When the young sows have farrowed, give linseed meal (10 per cent. of the ration) where skim milk is not available. In the case of young sows, the litter may be too large for the sow. Further, have the following mineral mixture made up:—Wood ashes, 1 part; coarse salt, 1 part; sterilised sweet ground bonemeal, 2 parts. Give 4 tablespoonfuls of this mixture in the feed daily to a sow with litter. A sow and litter should have plenty of exercise, dry quarters, and as much change of feed as possible. Wheat should not be boiled. It is preferable to soak it.

"*Mrs. M. A. C.,*" *Parrakie, reports young pig stiff in front legs and walks on its knees. Reply—*The pig is apparently suffering from a condition very much similar to rickets. It is doubtful if any treatment will produce very satisfactory results, but the following may be tried:—If possible, provide a liberal allowance of skim milk in the diet or else give about 5 per cent. linseed meal in the ration. Give 1 to 2 tablespoonfuls of bicarbonate of soda (baking soda) in the trough feed daily, and 1oz. Epsom salts once weekly; 2 teaspoonfuls of cod liver oil should also be given daily.



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## POULTRY INQUIRIES.

[Reply supplied by Mr. C. F. ANDERSON, Government Poultry Expert.]

### Poultry for the Redhill District.

*"What is the best breed of fowl for this district?"* (Redhill Agricultural Bureau.)  
Reply—The answer to this question depends on two circumstances—(1) Whether the fowl is required solely as an egg producer; or (2) whether a bird is required that will lay a fair number of eggs, and at the same time provide a good table bird. If the birds are required for egg production only, then the outstanding breed is the White Leghorn. The Australian White Leghorn, and South Australian in particular, is outstanding as an egg producer. In flocks of 200 birds or over, they are easily two to three dozen eggs a year ahead of any other breed. The fertility is better, the hatching is better, and they are more easily handled, and they will stand hot temperatures better than any other bird. If a dual purpose is required, then one of the heavier breeds is necessary and I recommend either the Black Orpington, Rhode Island Red, or Light Sussex. The Black Orpington has been specialised to a larger extent during recent years as an egg producer than any of the heavier breeds. However, there are also several good laying strains of Rhode Island Reds and Light Sussex. In any case, whatever breed is selected, special care should be exercised to see that the particular strain selected is a producer of 20z. eggs or over, as with the industry it is of the utmost importance that as large a percentage of 20z. eggs and over as possible be produced, in order that a profitable export trade be built up.

## DAIRYING INQUIRIES.

[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor.]

### Pigs for Eyre Peninsula.

*"Can the Dairy Branch of the Department give information concerning the advisability of making a cross of the Large White and Middle White pigs, and some idea as to the best weights at which to sell the pigs?"* ("C. B." Yantanaby.)  
Reply—The dead weight for a bacon pig on the local markets is about 120-130lbs., dressed weight, or about 170-180lbs. live weight. The ideal pig of this weight should not be too fat, but evenly covered with about 1in. of fat along the back. If the pig is too plump, although of the right weight, it would be termed over-fat. On the other hand, a pig might be too old, have grown in frame and bone, and although about the correct live weight, might be too lean or unfinished. I would suggest marketing pigs at never more than 130lbs. dressed weight, and the nearer to 120lbs., if well finished off, the better. With regard to your suggestion to go in for Large White x Middle White, I would suggest a little more consideration. This cross is accepted at the present time as the ideal export pig, but with your hot climate and distance from the port of shipment (Port Adelaide), it is questionable whether it would be quite sound at the present moment. I would suggest that you concentrate more on the local market, either Adelaide or Port Lincoln, at present, and with this object in view would suggest a pure Berkshire boar and Tamworth sows, or, if Tamworth sows are hard to procure, use a Berkshire boar on Berkshire x Tamworth sows. This cross is very acceptable for the local bacon trade, and the Tamworth sows are good mothers and have large litters. I think this suggestion is worth considering for the present, for even if a sound export market is opened, it would take you very little time to change over to the White pigs. Your remark about not being able to follow the local pig market suggests that the pig breeder's maxim is correct—"If you are going to breed pigs, keep on breeding, sell when in the right condition, and do not try and pick the market." If you have a regular supply you will catch the "ups" as well as the "downs" of the market.



## SECOND ANNUAL CONFERENCE OF S.A. BUTTER AND CHEESE FACTORY MANAGERS' AND SECRETARIES' ASSOCIATION.

OPENING ADDRESS OF THE MINISTER OF AGRICULTURE (HON. S. R. WHITFORD, M.L.C.).

It is with pleasure that I meet you again on the occasion of your Annual Conference and I take this opportunity, Mr. President, to congratulate you on your election as second President of the association. I feel that the association is fortunate in having at the helm in its opening years a man whose tact and high technical and business attainments are well calculated to steer it along the course of success.

I want, too, to congratulate you all upon the common sense that has led to the formation of this association; although I must add that, in these bustling times, it appears, if anything, to have been a shade overdue. Incidentally, of course, you are trade rivals, and as such engaged in trade warfare, not indeed on your own behalf, but on behalf of those whose special interests you happen to represent; but, on the other hand—and this, I take it, is your more important function—it is your business and privilege to convert into merchantable articles the primary produce that comes to you from our fields. In the latter connection, independently of any trade rivalry, you owe it to your clients, to your reputations, and to the State, to see that as far as in you lies, articles only of the highest quality that the raw material admits of should be allowed to leave your factories. And towards this end your mutual deliberations, coupled with such advice as the officers of the Department of Agriculture are always anxious to give, should eventually lead. The State has a very special interest in this aspect of the question; second and third rate articles, although regrettable, may sometime pass muster at home; but, as you are no doubt aware, our economic existence as a community is wholly dependent upon our ability to export commodities abroad at a profit; unfortunately, the number of these commodities is extremely limited; butter can, however, be reckoned among them, and probably cheese, too. And I need not remind you in this connection, that on the markets of the world "good enough" will not lead us anywhere: and that those responsible for the output of inferior articles not only injure themselves and their clients, but in addition hinder first class articles from realising their full value on the markets of the world, and do untold injury to the State, that stands in need of every penny that can be wrung out of overseas markets.

I know that I have laid myself open to the obvious retort that our overseas exports of butter and cheese are infinitesimal, and that over portion of each year we are actually obliged to import from neighboring States the butter we require for home consumption. I regretfully admit that such is undoubtedly the case—at present; but need it necessarily continue to be so indefinitely? Do not our interests as a State require that the dairying industry should expand and that dairy exports should ultimately throw into the shade the requirements of home consumption? And do not our local economic, climatic, and soil conditions permit of it, and in present circumstances even demand it? It is true that it has become customary to depreciate the value of South Australia's natural dairying conditions relatively to those of more generously endowed States, such as New South Wales and Victoria; we are said to lack that special type of permanent natural pasture that is so typical of normal dairy development. But what Nature has denied, art can frequently make good; the improvement of pastures by top-dressing and the introduction of suitable pasture plants has done much within recent years towards overcoming our natural disabilities; and it is safe to say to-day that every district with a yearly rainfall of not less than 20in. is a potential dairy district. Under this description would come our Northern and



Southern Hills Districts, the whole of the South-East, the Southern District, parts of the Lower North and of Yorke Peninsula, Southern Eyre Peninsula, and Kangaroo Island; whilst on the reclaimed Murray swamps we have probably the most productive dairy district in the whole of the Commonwealth.

But, in addition to this, dairying can be practised to advantage even under conditions that are well below the ideal. Of this we had striking examples in the dry nineties, when our northern farmers, after the failure of their crops, were actually kept on the land by their cows; later on more favorable seasons and high-priced wool made them forget their benefactors and discard cows for less exacting sheep; but to-day there is many a one who ardently wishes his cows were back at the pail again. And the dilemma of the northern farmer is being repeated on practically every wheat farm of the State; the decline in the price of wheat has been so pronounced that all are crying out for cows to provide their owners with ready cash to meet current expenses. There appears to me to be no reason why every farmer in the State should not, in the course of time, average six to 12 milch cows; and when this has been brought about, and suitable areas in the better rainfall districts have been split up into useful size dairy farms, our exports of dairy products should, under good management, exceed in quantity and value those of corresponding products consumed at home, much to the advantage of the financial standing of the State.

Such, then, is the goal that we should keep constantly before us; and our present necessities are so great that we should strive to reach it at the earliest possible moment. From the latter point of view, however, recent dairy statistics make most depressing reading. In 1923-24 we had 169,000 milch cows; in the same season we made about 7,700 tons of butter and 1,650 tons of cheese, whilst the estimated value of total dairy production in South Australia was approximately two and a half million sterling. Six seasons later, in 1929-30, our milch cows had fallen to 104,000, a decline of over 38 per cent.; our butter production to 4,800 tons, a decline of over 37 per cent.; our cheese production to 1,580 tons, a decline of close on 4 per cent.; and the value of total dairy production to less than two million sterling, a decline of close on 22 per cent. It is very clear, therefore, that there is very much leeway to make up before we can hope to benefit much from the advantages which dairying can confer upon both individuals and the State. Nor can we hope to come within reach of them in reasonable time, unless we can enlist the services of all men of good will, able to assist in however modest degree; and this is the chief reason why I am bringing the matter before you to-day.

For the most part you are stationed in country centres: your avocations bring you in daily contact with farmers and producers generally; your ability to give advice on a variety of technical questions tends to invest you with special influence in your respective districts. Is it too much to ask of you, as citizens of the State, to use that influence not only in the interests of the factories with which you may be connected, but also in assisting in the development and expansion of the dairying industry of the State?

I am not an expert on the subject, and have no intention of dictating what should be your course of action, and my suggestions on the matter must be taken for what they are worth.

I suggest that you should never weary of preaching the gospel of dairying to all likely to benefit therefrom; to the average farmer the advantages in these times of the fortnightly dairy cheque should be emphasised; to the regular dairyman the advantages of heavy milkers, of generous feeding, kindly treatment, high class bulls; and to all alike the absolute essentialness of the strictest cleanliness in all dairy work. I suggest that you plead for the heifer calf and stress the folly and lack of public spirit of disposing of it as a vealer, however tempting current prices might be. And in cases of special difficulties do not hesitate to call to your assistance officers of the Department of Agriculture.



May I suggest, too, that every one of you should be an active member of a local Branch of the Agricultural Bureau. In the latter capacity you should endeavor to overcome the unfortunate aversion of some farmers to the Dairy Industry Act; you should try and convince them that the sole object of the Act is to raise the standard of our dairy products to the possible maximum; that high quality of dairy products means improved average prices, reflected eventually in higher prices for milk and cream.

This is the merest sketch of what I imagine you can do for the public good; and I feel sure that I shall not have appealed to you in vain.

There is one other question upon which I would like to dwell very briefly; a question which, I understand, is giving grave concern to all those interested in the dairy industry—I refer to the threat of margarine to the industry. I think that I have made clear my opinion as to the great importance of the dairy industry to this State, and particularly in relation to the present financial crisis. I know, too, that at current prices for dairy products many dairymen find it difficult to make both ends meet; in the circumstances, with all those interested, I view with grave concern the appearance on our markets of an artificial product sold in open competition with butter. However much we may try to gloss over the fact, with statements to the effect that margarine cannot possibly displace first-grade butter on the home market, the fact remains that its presence on the market can have but one ultimate effect, and that is a general all round decline in butter prices, which will be calamitous to producers throughout the Commonwealth. I am informed that at the present time margarine is selling in Victoria at the rate of 30 tons a week, representing an output of approximately 1,600 tons per annum, with practically unlimited possibilities of expansion. The dairy interests of the other States are even greater than our own, and, personally, I am of the opinion that it would be a statesmanlike action to prohibit the manufacture of margarine within the Commonwealth and its importation from abroad. It is probable, however, that the beef interests of the Eastern States are too powerful to permit of any such action. I propose, therefore, in the interests of our own dairy industry, giving close consideration to a resolution passed at the 1927 Conference of Ministers of Agriculture to the effect that the use of milk products in the manufacture of margarine should be prohibited by law. It would appear that margarine cannot masquerade as butter, except with the assistance of skim milk, butter, &c., and it seems anomalous that an industry of so much importance to the State should be compelled to supply the weapons by means of which it will gradually be bled to death.

In conclusion let me express the hope that your deliberations will prove successful and help to improve general conditions in the dairy industry.

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## THE PRODUCTION OF FAT LAMBS.

[By R. C. SCOTT, Supervisor of Experimental Work.]

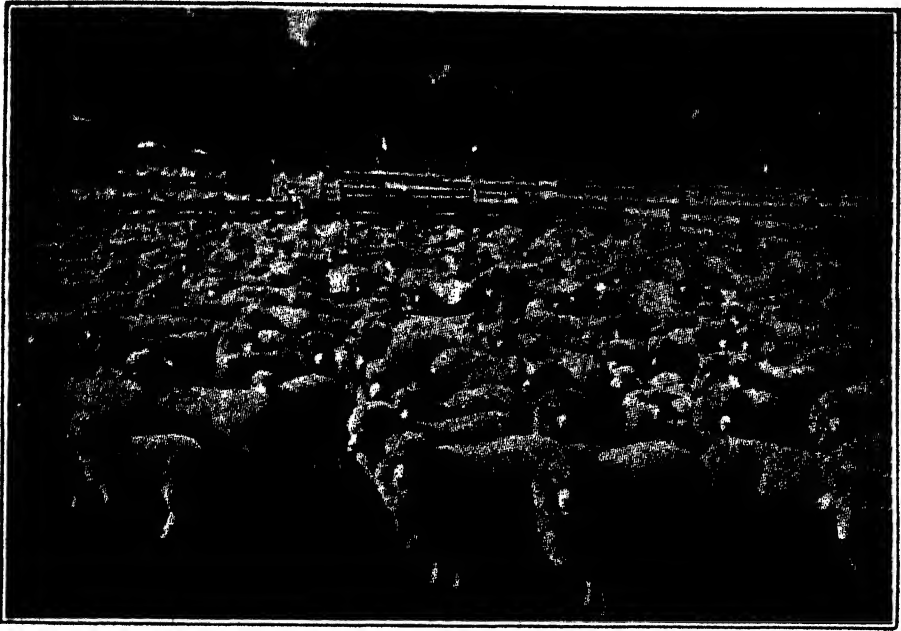
At the present time the overseas market demands a small lamb dressing in the vicinity of 32lbs. to 36lbs., and for a carcass of this type is prepared to pay a higher value per pound, even if the quality is not as good as that of heavier weights. In order to take our place in the export trade, we must endeavor to produce a light-weight lamb with short, well rounded body, full loin, well covered withers, legs filled both inside and outside, and with the fat well distributed throughout the body.

As a rule, the breeder of fat lambs in South Australia is working under vastly different climatic conditions to those obtaining in the great meat exporting countries of the world, and must, therefore, adjust his plans to meet these special conditions. Our aim must naturally be to produce the most profitable type of lamb according to the climate, the system of farming in vogue, and the class of parents available. Lamb breeding cannot be commenced until the holdings have been prepared for stocking. On many farms this provision has been made, and where farmers are not already producers of fat lambs, the acquiring of a flock and commencement of operations is strongly urged. It is a system of sheep management well suited to our agricultural holdings, inasmuch as the flock is reduced to a minimum at the time of the year when pasture is scarce, and at its maximum when grass is abundant. It fits in well with the operations of a wheatgrowing farm, and is a source of revenue which should be adopted by every farmer as soon as conditions permit.

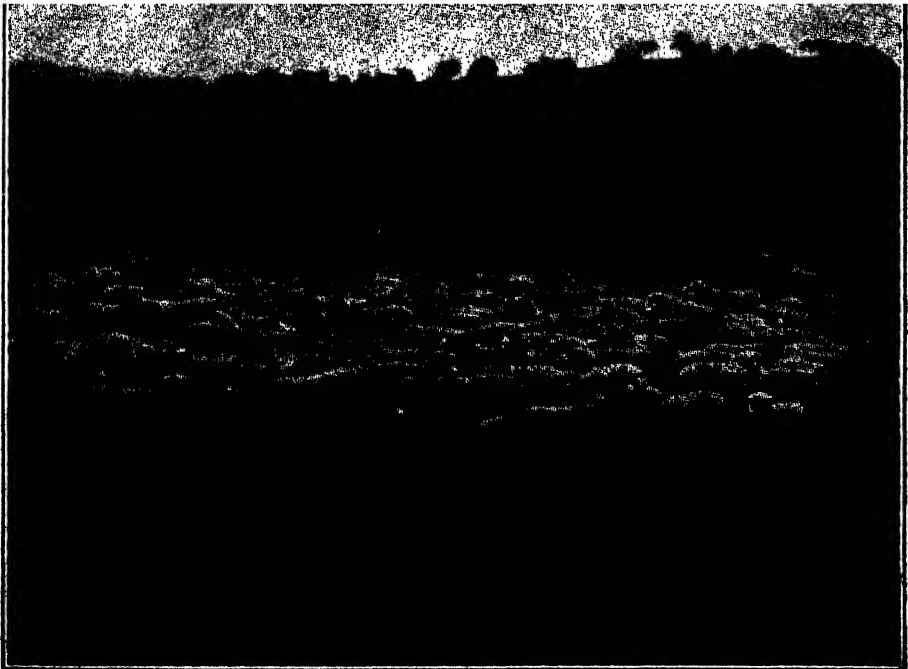
### CHOICE OF EWE.

As a mother for fat lambs, the crossbred ewe presents advantages over the Merino, and, as our export trade becomes established, so will the Merino be steadily replaced by ewes of this class. However, at the present time it is impossible to purchase any number of half-bred longwool ewes, whereas the Merino can generally be secured in an even line of any size and at any time of the year. It is a breed admirably suited to the climatic conditions of most districts, is easy to fence, and cuts a more valuable fleece than any other breed of sheep. For these reasons the farmer's lamb breeding flock must, for the present, consist usually of large-framed, plain-bodied Merino ewes. Independently of their availability, the half-bred longwool Merino ewe is the best mother of fat lambs, and in our higher rainfall areas is preferable to the Merino, and in the southern and south-eastern districts may be recommended to farmers. She offers the advantage of a higher lambing percentage, better-shaped and earlier-maturing progeny, and is able to withstand wetter and colder conditions better than the Merino. Either the Border Leicester, Romney Marsh, English Leicester, or Lincoln-Merino ewes may be utilised. Roseworthy College experiments indicate that, under the climatic conditions of that district, the Border Leicester-Merino is to be preferred, but in New Zealand the Romney Marsh-Merino mother is favored. If available in sufficient numbers and of uniform type, the Corriedale would prove a satisfactory mother for a lamb-raising flock. However, generally speaking, we have little option regarding the choice of a mother, since the half-bred longwools or Corriedales are extremely difficult to obtain. The Merino ewe must remain the farmers' sheep for the majority of our agricultural holdings, whilst in our higher rainfall areas the half-bred longwool should be secured when available.





Merino ewes of the type suitable for use as mothers of export lambs.



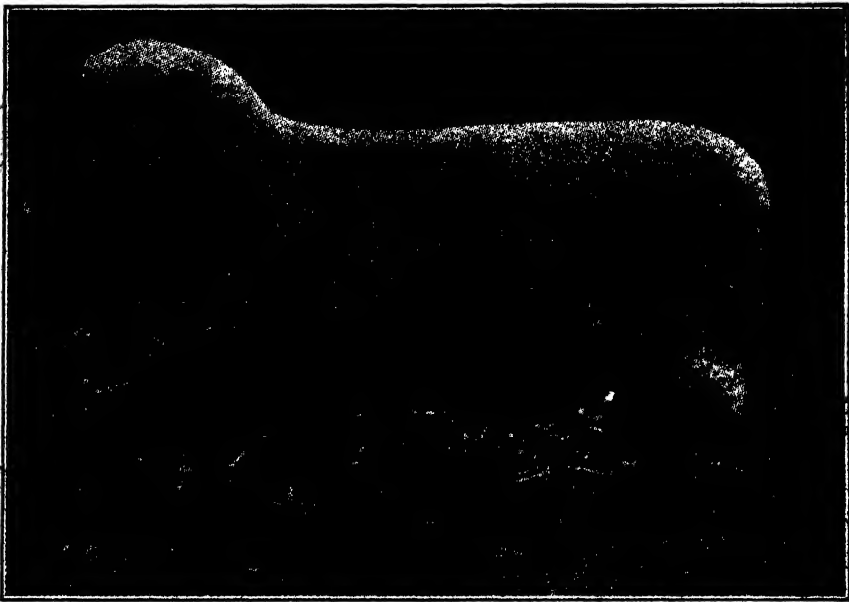
Half-bred long-wool ewes which can be regarded as the ideal mothers for export lambs.



## CHOICE OF SIRE.

The influence of a ram is to stamp special qualities on the progeny, and thus provide the type of lamb required for maximum returns. It is evident that the Merino is not suitable. Of the Longwool breeds, all are more or less defective, with the English Leicester the best of those available. This breed gives a fairly shapely lamb, and if the average climatic conditions of the district are such that there is a possibility of having to carry over a percentage of lambs until the following year, the value of the fleece or pelt is an important consideration, favoring the use of the English Leicester under such circumstances.

Regarding the Short-wool breeds, the Dorset Horn is a sire which imparts early maturity to his progeny. Lambs by this ram are well suited to the local market, and, owing to their rapid development, frequently command high prices early in the season



Southdown Ram.

when sucker lambs are scarce. However, for export purposes, they are not so satisfactory, as they tend to become too heavy before priming. In consequence, a large percentage does not answer the requirements for a light weight lamb, and, therefore, realise lower poundage values.

Of the Down breeds, the Southdown stands alone as a sire of lambs of the ideal type for the export trade. London buyers demand a relatively small, but well furnished, lamb, and the Southdown supplies these requirements better than any other breed.

The Shropshire ram yields a good class lamb, but there is always a percentage of a coarser type. On account of this irregularity, it is not equal to the Southdown for producing export carcasses, and its tendency to yield wool-blind lambs is also a disadvantage.

The Suffolk sires lambs almost as early maturing as those by Dorset Horn. The meat is of good quality, but, on the average, the carcass is not shapely, being long and lacking in depth and width.



Summarising the position from the point of view of the ram, the Southdown must be given pride of place for the production of choice, light-weight lambs.

If South Australia is to establish a high reputation in the overseas lamb market, we must ship a uniform type of carcass. The Southdown is the breed best able to yield lambs of the right quality, and as the sire for export lambs is to be strongly recommended over all other breeds.

The Suffolk and Dorset Horn have value in certain areas because of their early maturity, and occupy a definite place in the production of lambs suited to the local market.

## GENERAL MANAGEMENT OF LAMB-BREEDING FLOCK.

### LAMBING SEASON.

The main point is to so arrange the mating that the lambs are dropped at a time of the year when feed is plentiful. As soon as a young lamb requires more than its mother's milk, it must have good, succulent pasture, or else it gets stunted in growth. Therefore, the lambing time selected must be such that there is prospect of four to five months of good grazing ahead.

In cold countries, spring lambing is generally practised, but in South Australia lambing is chiefly confined to the autumn, when there is less danger from exposure.

Lambs from Merino ewes do not do well when dropped in cold weather, and for that reason, provided the feed conditions are likely to prove favorable, should be dropped towards the end of autumn or early winter. At this time the weather is milder and the lambs become strong before being subjected to cold, bleak conditions.

The average gestation period for a Merino ewe is 150 days, and therefore it will be necessary to mate up about five months before the time desired for the first lambs to be dropped. In most districts the lambing season extends from about mid-April to mid-June, in which case the rams would be joined with the ewes towards the middle of November.

### MATING.

When mating for fat lambs, the number of rams should not be limited, and, if possible, more than one should be turned in with the ewes, as they then work better than if alone. In ordinary circumstances, not more than 50 ewes should be mated to one ram, and preferably 40 for rams of British breeds.

The rams selected should be strong and healthy. If either too fat or too low in condition, the result is not likely to prove satisfactory. Ram lambs from six to seven months old are quite effective as sires, but it is not wise to use them as it checks their development. If the breeder has no alternative, he should mate the young rams with half the usual number of ewes. As a ram gets older he usually becomes slower to work, and should not be relied upon after he reaches full mouth. Shearing and dipping checks the desire to mate, and therefore these operations should be carried out at least a fortnight before joining with the ewes.

At times, particularly in warm weather or when the rams are carrying too much condition, it is difficult to get them to remain with the flock. In this case, it is advisable to yard overnight for a few times, and thus encourage mating. The rams may be allowed to remain with the ewes for from 8 to 10 weeks, and, if available, a fresh ram should be added during the last fortnight to help catch up any ewes that have been missed. The ewe should not be too old, and should never be broken mouthed. On the other hand, when young Merino ewes are mated to British rams, lambing fatalities are more frequent. The aim should be to secure 6-tooth to sound mouthed ewes, and cull as soon as there are signs of the teeth failing. Ewes should go to the ram in good store condition and be maintained in this state during the whole of the gestation period.



#### CARE OF LAMBING FLOCK.

If feed gets short in the autumn, the flock must be hand fed. It is a mistake to delay hand feeding until the paddock grazing gets scanty and the ewes become weak. With roughage in the field, a sheep can be kept in good health at comparatively little cost, and the expense is amply repaid. One pound of grain daily with 2lbs. to 3lbs. of chaff will be sufficient for the purpose.

As lambing approaches, the more sheltered fields should be reserved for the lambing flock. In most districts foxes prove troublesome, and for some time before the first lambs appear poisoned baits should be distributed. A satisfactory bait can be made by rolling a pellet of raw mutton containing strychnine, equivalent to the quantity



Typical Export Lambs.

which could be placed on a threepenny piece. The lamb is the source of revenue, and close attention must be given to the flock. During the lambing period it should be visited at least once daily and assistance rendered where necessary.

On the completion of lambing the dry ewes should be removed and placed on the poorer pastures, and the wet ewes and lambs on the most succulent feed available.

#### TAILING.

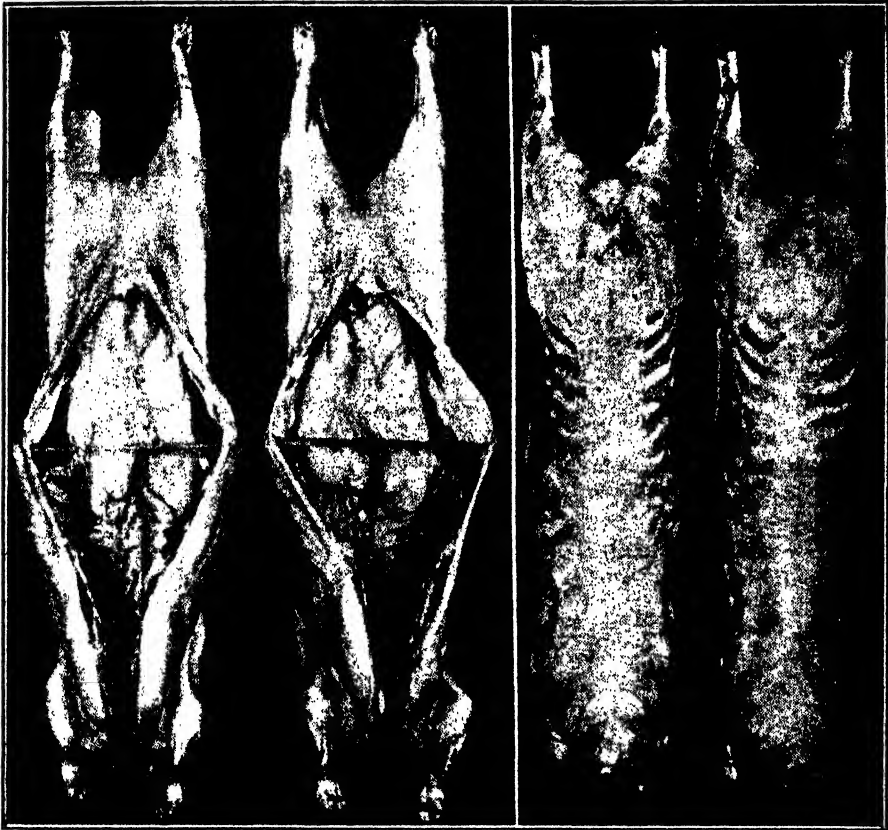
Tailing and castrating should be done when the lambs are about two to three weeks old. At this age they suffer less shock and recover more quickly than when either younger or older. Further, it checks the tendency towards coarseness and staggyiness of wether lambs. It is advisable to go through the flock two or three times during the lambing period, marking all lambs of about the right age. If an attempt is made



to do them all at the one operation some would be much too old. In order to avoid loss from tetanus, marking should be performed in a temporary enclosure erected in a well-grassed field.

#### MARKETING LAMBS.

The lambs should not be weaned before disposal, but marketed straight off the mother. It is essential that they carry what is termed "bloom," by which is meant the freshness and sappiness of lambs reared by good mothers in succulent pastures and marketed at the correct age. Most important in the marketing of lambs is the feed available. Nothing is equal to rich pasture, and hand feeding can never replace



First quality export lamb carcasses.

grass so far as the lambs are concerned. In abundant pastures, and with good milking mothers, a lamb will increase in weight at the rate of about  $\frac{1}{2}$  lb. per day from birth to the age of five months. When 14 to 16 weeks old, some lambs will be sufficiently prime and weighty for marketing. As has been said, the English market demands a lamb dressing approximately 32lbs. to 36lbs., and a lamb weighing from 70lbs. to 75lbs. on the farm will provide a carcass of this weight. A lamb weighed on the farm usually has a full belly, with the result that the shrinkage on dressing under such circumstances will vary from 52 to 57 per cent. On the other hand, lambs taken from their mothers for some time before slaughter, as is the case when consigned to the Depot, will lose from 48 to 54 per cent. of their pre-slaughter weight. Therefore, lambs should be consigned from the farm when in prime condition and from 70lbs. to 75lbs.



live weight. It is a mistake to keep them until they become too heavy, as when the feed is less succulent they tend to lose their "bloom" and thus command lower values, whilst grass seeds frequently penetrate the flesh and render the carcass unfit for shipment overseas.

Every care must be exercised to avoid bruising, as this is a cause of rejection for export which is far too frequent in our fat lamb industry. A lamb is very easily damaged, and the use of sticks, lifting by the wool, or rough handling in any way must be strongly checked.

#### SUMMARY.

1. The English market demands a light weight, prime quality lamb, weighing about 32lbs. to 36lbs.
2. On account of her availability and high valued fleece, the large-framed, plain-bodied Merino ewe must be utilised on the majority of agricultural holdings.
3. In higher rainfall and colder districts, the half-bred longwool Merino ewe offers advantages over the Merino.
4. The Southdown ram is the best sire for the production of lambs of the ideal type for export, but, if not available, Suffolks or Shropshires are permissible.
5. Lambs should be dropped at a time of the year when mild weather may be expected and there is prospect of several months of good grazing ahead.
6. Over the bulk of South Australia lambs should be dropped in autumn.
7. Not less than 2 per cent. of rams should be joined with ewes.
8. Use rams in good, strong condition, and not too old.
9. Mate only sound mouthed ewes in good store condition.
10. Allow rams to remain with flock for from eight to 10 weeks.
11. Adopt hand feeding in autumn as soon as pasture becomes short.
12. Give close attention to lambing flock.
13. Mark lambs when about three weeks of age.
14. Avoid loss of "bloom" by disposing of lambs when young.
15. Market lambs when 70lbs. to 75lbs. live weight on the farm.
16. Exercise care in handling to avoid rejection for export on account of bruises.
17. Maintain flock on most succulent feed available.

#### BLUESTONE FOR WORMS IN SHEEP.

"When dosing sheep with copper sulphate, with or without mustard, will there be any danger if the strength of solution is made three times as great as the quantities advised (½oz. to 3ozs.)?" Replying to this question, Mr. A. H. Robin, B.V.Sc., Government Veterinary Officer, says the Stock Department is now recommending the use of bluestone solution mixed at "double strength" to that formerly used (although, if weak sheep are to be treated, we consider it would be wisest to stick to the old strength, viz., 1 per cent.

The new proportions are therefore:—

- (a) Bluestone, 4ozs.; water, 1½galls.; or
- (b) Bluestone, 4ozs.; mustard, 4ozs.; water, 1½galls.

*Doses*:—Adult sheep (4-tooth and over), 2ozs.; sheep (12 months), 1oz.-1½ozs.; lambs (according to age), ½oz.-1oz.

The use of these more concentrated solutions means that the dose to be given per animal can be considerably reduced, which is undoubtedly quite an advantage. These solutions are well tolerated, and appear to be giving even better results in the field than the weaker 1 per cent. solution formerly recommended.

The administration of solutions stronger than the above concentration is not advised.



## THE POULTRY INDUSTRY.

*Address in connection with Presentation of Trophies Won in the Red Comb 1930-31  
Egg-laying Competition, held at Parafield Poultry Station.*

[By ARTHUR J. PERKINS, Director of Agriculture.]

Although this series of Competitions are open to any Poultry-Keeper in the State, the credit of initiating them belongs rightly to the Red Comb Association. There is sometimes a tendency to look upon Competitions of this kind as a means of advertising the birds of the lucky winners; personally, however, we may, I think, take a broader-minded view of their essential functions. They may be taken to represent a genuine effort to secure improved production in an important line of rural activity. The 185 birds under test in 1930-31 averaged 203 eggs for the 12 months (say 17 dozen); probably the mean yield of our average local hens would not be more than seven dozen over the same period of time. If the inherited tendencies of these heavy-laying strains were gradually spread over the State, and succeeded in raising the mean State laying production by a couple of dozen per hen only, this would represent increased production at the rate of £150,000 per annum for one and a half million fowls, which we possess at present, and this without additional handling or feeding costs. From this point of view I trust that the progeny of these Competition Fowls, like the leaven in bread, will gradually spread throughout the State and lead, in the course of time, to higher and more profitable egg-production.

From the latest available Statistics (1928-29) I find that the value placed on all South Australian Industries is approximately 36 million sterling per annum, and that in this total are included three items, the value of each of which is slightly over one million sterling, namely, Poultry, Mining and Quarries, and Forestry, &c. It follows, therefore, that Poultry Keeping ranks to-day with the great industries upon which State and Commonwealth depend for their economic wellbeing.

You must all be aware of the economic difficulties that are besetting us at the present time, and that in the main they are attributable, apart from past extravagance, to a calamitous fall in the prices of rural produce, by means of which we usually seek to meet our heavy commitments abroad. This means that, for the time being, we must strain every nerve to export rural produce—the only commodity that we are able to export in present circumstances—in far greater bulk, if not of greater value, than we have hitherto done. Hence, the great national importance that attaches to any rural industry that has a ready export outlet, and among these I am happy to think that the Poultry Industry can be included.

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**EXPERT ADVICE ON GRASSES AND CLOVERS.**



I am, of course, aware that those who aim at exports must perforce face the ups and downs of fluctuating world prices, and that if everything be taken into consideration, individual losses are perhaps as frequent as net profits. For the past 12 months we have been compelled to watch our main export staple—Wheat—being exported overseas at a heavy loss to producers. We hope, indeed we know, that this is no more than a passing phase in our economic life, which all must face who are dependent upon the vagaries of World markets. Farmers know that the present position has been paralleled in our past history on several occasions, and in spite of their precarious position those with sufficient experience have not lost heart.

The point I wish to make is that Poultry-Keepers, like Wheat growers, cater not only for local consumption, but have also an export outlet to watch. I am told by Mr. C. F. Anderson (Poultry Expert) that here in South Australia we produce 70 per cent. more eggs than we can consume, and it follows, particularly if the Industry is to extend still further, that special attention must be given to the export outlet. And when the time comes, as come it must from period to period, that export prices are not altogether to our liking, and even may be below costs of production, it is to be hoped that Poultry-Keepers will follow the example of our hard-ried Wheat growers, and not scuttle for shelter and abandon an export market which it would take many years and much Capital to recapture.

Now, I think that it must be admitted that within recent times, with grain and mill offal at bedrock prices, Poultry-Keepers may be said to have been on a very good wicket. But let me say that, however great our temporary prosperity, this is hardly the time for motor cars and other luxuries, but the time to husband our resources so that we may be in a better position to weather the difficulties that are always in the offing.

I am, of course, aware that as soon as a surplus is in sight our thoughts turn to the populous centres of the larger States, and that in the past Broken Hill, Sydney, Melbourne, and Kalgoorlie have in order of importance absorbed portion of our surplus. And as members of a federation that has perhaps unconsciously built up secondary industries without possible export outlet at the expense of primary production, it is only right that we should have free access to the large cities that have developed as the immediate result of this policy. It is nevertheless necessary that some degree of common sense should be exercised in such matters. If any large city is short of eggs, and we possess a large surplus, it is sound common sense and of material benefit to all concerned that we should fill in the gaps from our abundance, but if that city is already adequately supplied from the immediate neighborhood, the result of such an invasion of the market can only be an all round fall in prices, with the probable consequence that city folk are supplied with rural produce below costs of production. This indeed is the usual historic tribute which the country has paid to dense centres of population. As a matter of fact, I am informed that, in the aggregate, New South Wales, Victoria, and Queensland have already a 25 per cent. surplus of egg production. Is it not well, therefore, that we should come to an understanding before attempting to fight them on their own markets? Our geographical position appears to suggest that we can meet the requirements of Broken Hill and Kalgoorlie, but in normal circumstances can the same be said of Sydney and Melbourne?

Personally, I have great faith in our Poultry Industry. I wish it to expand considerably beyond its present dimensions; not merely in the hands of specialised poultry breeders like yourselves, but on every farm in the State. But if this is to take place, our attention must be centred, not on the over-supplied home markets, but on overseas markets, and particularly the British market. If we succeed in supplying these markets we shall not only benefit ourselves, but be of infinite assistance to the Commonwealth as a whole.




Latest statistics show that our export of eggs for the period 1929-30 have a value of approximately £25,000, that is to say, barely 2½ per cent. of the value of total Poultry Production. It should surely be our aim to expand these values to worth-while dimensions, and the sooner we set about it the better. I am glad to learn that your Association exported 10,000 cases last year and I trust that you will continue to lead the van in this particular direction.

I notice that in 1928 Great Britain imported close on 18 million sterling worth of Eggs in the shell and about two and a half million sterling not in the shell. Here is a market that is surely worth capturing. I am aware that this market makes certain demands, and as potential suppliers it is only common sense that we should aim at meeting these demands. In this direction it has always been the policy of the Department to aim at the 2oz. egg, and I am glad to think that your Association shares our views in this direction. We know, too, that farm eggs are not always up to export standard, and just as it will be our endeavor to induce farmers to produce more and more eggs, both in their own interests and in the interests of the State, so, too, we shall try to impress upon them the absolutely necessity of placing on the market eggs that can safely be exported in the shell. This is very largely a matter of educational propaganda. We have in Mr. Anderson a highly competent young man, who is full of energy, and we can depend upon him to do his utmost for the Poultry Industry in every direction.

On another point, have we not neglected of late the export of dressed poultry, which was of some importance in pre-war days? Great Britain imports between two and a half and three million sterling's worth annually. Why should we not share in this export outlet of produce?

Let me extend my heartiest congratulations to Mr. W. Wiese, of Cabra, for having entered the winning Hen—a White Leghorn pullet—which laid the fine total of 279 eggs. This performance entitles him to hold the 20-guinea Cup presented by your Association. I must also congratulate Mr. C. G. Gavin, of Salisbury, whose team of six birds laid the highest aggregate total of eggs, namely, 1,458 eggs, or an average of 243 eggs per bird.



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## TEST WITH WOOD GAS PROPELLED TRACTOR.

TRIALS HELD AT ENFIELD, SOUTH AUSTRALIA.

The Committee on Wood Producer Gas as Applied to Mechanical Transport recently arranged a working test of a tractor driven by wood producer gas. In view of the tests on the general principle of this gas producer, as described in a previous report on tests with a Berliet lorry, the committee decided that the main point for consideration was the relative fuel consumption costs of the wood gas driven tractor as compared with a petrol driven tractor.

Mr. A. G. Pritchard, of Wakefield Street, Adelaide, who had patented and manufactured an improved gas producer for use on tractors and lorries, had fixed one to a 2-ton Cletrac tractor and had been operating it for a period of approximately 180 to 200 hours in experimental and demonstration work, mostly on the farm of the Mental



Wood Gas Propelled Tractor drawing a Six-Furrow Plough.

Hospitals Department, near Enfield, drawing plough, cultivator, and combine at different times. As the Mental Hospitals Department possessed a Cletrac of the same capacity it was decided to carry out ploughing tests on this farm with the two tractors.

The plough at the farm was a six-furrow Shearer set plough, and through the courtesy of Messrs. John Shearer & Sons, Ltd., of Kilkenny, the use of another plough of the same make and size was secured.

To ensure that each tractor was given an equal duty, it was arranged that they should follow each other round the field, and at each second round they should change ploughs. In this way any inequality in draught, &c., of the ploughs, or in the texture, &c., of the land would be adjusted.

The trial was held on Thursday, April 30th, and Mr. R. S. Longstaff, of the Steam Boilers Department, was appointed to supervise the test throughout the day.

Each morning the following routine was observed:—The engine was started on petrol and the furnace fuel was at once lighted by means of a kerosene torch and a small induced draught fan was manually operated to bring the fuel to a state of incandescence.



The engine fuel inlet was then switched over from petrol to wood gas. The whole of the preparatory arrangements were completed and the engine worked on wood gas within a period of five minutes.

The previous test with the wood gas driven lorry having proved that most of our more common varieties of timber produced a satisfactory gas if well dried (*i.e.*, containing not more than 10 per cent. of moisture), the committee did not consider it necessary to use more than the one kind of wood—*i.e.*, dry cut mallee.

The makers of the Cletrac considered that the most suitable speed for the tractor, when ploughing, was three miles per hour. The drivers of both machines were instructed, therefore, that this should be the approximate maximum rate at which they should drive, and the time check on each round of the field indicated that both tractors maintained a regular and satisfactory approximation to this maximum rate.

Mr. Longstaff's report showed that in 5 hours 47 minutes' engine running time (which included the journey from and to the homestead, time occupied in changing ploughs, and 4½ hours' actual ploughing) the petrol driven tractor consumed 8galls. and 1½ pints of petrol (equal to approximately 1gall. 3 pints per hour), and the wood gas tractor 180lbs. of wood and ½gall. of petrol. With petrol at 2s. per gallon and wood cut small at £2 per ton, the respective costs worked out at 16s. 5d. for the petrol tractor and 3s. 8d. for the wood gas tractor, which included 6d. for petrol. On a full 8½ hours' working the wood gas tractor would use no more petrol, as this was only used when lighting up the fire in the generator or after the engine had been standing idle for more than, say, 30 minutes.

Calculated on 8½ hours as an average day's actual working time the daily fuel cost would be—

|                                       | £ | s. | d. |
|---------------------------------------|---|----|----|
| For petrol driven tractor . . . . .   | 1 | 4  | 1½ |
| For wood gas driven tractor . . . . . | 0 | 5  | 2  |

showing a saving in favor of the latter of 18s. 11½d. per day.

Oil consumption was not checked, as previous tests indicated that there was no noticeable difference with either system; if anything, as the wood gas was "dry" it would be expected that the oil consumption would be less with the wood gas tractor than with the petrol.

The question of the relative condition or efficiency of the engines of the two tractors could not be accurately determined. If anything, the one to which the wood gas producer was attached was more worn, as it was older and had done more work.

The foregoing figures indicated that with wood at £2 per ton and petrol at 2s. per gallon, the fuel cost of the wood gas tractor was less than one-fourth of that of the petrol tractor. As the annual consumption of fuel for tractor purposes on a fair-sized farm would range from £100 to £160, it will be seen that this wood gas tractor opens up immense possibilities for economy in farming operations.

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In this connection the Forest Department furnished particulars of work done by two 2-ton tractors and three No. 30 tractors on the different forests. These five tractors aggregated 5,849½ working hours in the 12 months, using 9,059galls. of petrol (equal to 1gall. 4½ pints per hour), costing £867. Assuming that the ratio of consumption of the two fuels would be the same with the larger tractors as with the 2-ton tractors, the adoption by the Forest Department of the wood gas system would result in a saving to the department of approximately £682 with wood at £2 per ton. As the department had its own saw mills in localities where wood was practically a waste product, it should not cost anything like £2 per ton to cut it into small blocks for the producer.

So far as it was possible to say the risk of fire in the crop or grass from this wood gas tractor was no greater, if as great, as with the petrol or kerosene driven tractor, provided reasonable care in each case was exercised.

The committee had not had the opportunity of comparing the wood gas tractor with the kerosene driven tractor, but as power kerosene cost up to 1s. 5d. and 1s. 6d. per gallon in the outback farming districts, where wood was usually plentiful, there could be no doubt that the wood gas tractor would show to almost equal advantage as it did with the petrol tractor.

The committee inspected the several parts of the producer at the maker's works, and were pleased to note that the whole of the plant was manufactured in South Australia. The members were impressed with the simplicity of the whole outfit and with the quality of the work and material.

In view of the immense possibilities for economy in tractor farming and the very great advantage which would result to the State if many thousands of pounds now sent away for petrol and kerosene could be retained in the State, the committee recommended that one of these wood gas producers be fitted to the tractor used by the Forest Department, at Kuitpo, for further demonstration, and that the Government reduce the registration fees on tractors and lorries propelled by charcoal or wood gas to a nominal sum, as has been done in France.

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### PRESSURE IN TANKS.

Replies to the following questions asked by the Blackheath Branch of the Agricultural Bureau were supplied by Mr. T. A. Macadam, Lecturer in Building Construction at the School of Mines:—

Question 1—"Which would cause more pressure in piping for irrigation purposes: a tank holding 5,000galls. of water, built to a height of 6ft., or a tank holding the same capacity with walls only 2ft. high?"

Reply—"The tank holding 5,000galls. of water, built to a height of 6ft., would cause the more pressure.

Question 2—"Would there be more pressure in a 1½in. pipe leading from the bottom of a tank 6ft. high full of water, holding approximately 5,000galls., than there would be with the tank empty and length of 1½in. piping 6ft. high attached to piping in bottom of tank and kept full of water?"

Reply—"No."

Question 3—"Would it increase the pressure to have the piping leading away from the centre of tank in the bottom than, say, a foot in from the side?"

Reply—"When bottom of tank is level the answer is 'No'."

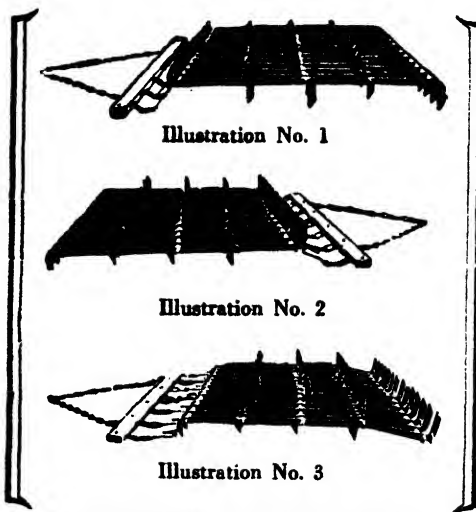


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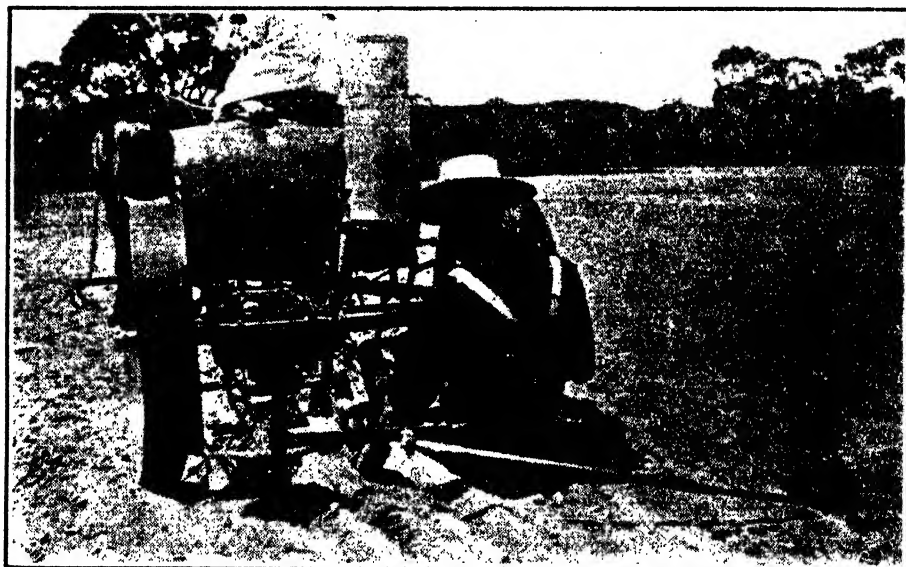
## TOBACCO CULTURE.

[By R. C. SCOTT, Supervisor of Experimental Work, and S. B. OPIE, Field Officer.]

(Continued from page 1010, *Journal of Agriculture*, May 15th, 1931.)

## TRANSPLANTING.

In the Adelaide Hills November is the best planting month, although some growers commence operations earlier in the season. Experiments at Mount Barker have shown that mid-November plantings produce the best plants, but much depends on the character of the weather. When a comparatively warm October is experienced the earlier plantings offer advantages, but if cold, wet weather prevails, the later sown plants will not only catch up, but eventually make better growth than earlier sowings. The planting season will therefore vary with the district, and should be as early as the mean temperature of late spring permit. Seedlings whose growth is checked by cold conditions will not make as satisfactory development as later sown plants which have



**Bemis Transplanting Machine.**

gone right ahead after being placed in the field. On the other hand, very late planted seedlings are frequently difficult to establish, because of the hot weather likely to be experienced, and fail to cure out to a satisfactory product. It may therefore be accepted that November is the correct planting month, unless local experience has proved otherwise. If possible, select dull, cool weather, whilst naturally showery weather would be best of all. The seedbeds should be thoroughly watered immediately prior to lifting the transplants, in order to allow them to be pulled from the soil without damage. In soils at all tight it may be necessary to loosen the earth with a digging fork to prevent injury. Select sturdy, well-formed plants with leaves about 4in. to 5in. in length, and with sound root systems. They should be placed in shallow boxes or tins and protected from the sun. The smaller seedlings are left for use later on if required, and, as they have been more or less disturbed, the bed should receive a good watering to pack the soil round their roots. Planting should take place as soon as



possible after the seedlings have been removed from the seedbed. In hot weather avoid the heat of the day, and endeavor to set out the plants in the late afternoon and evening. Under such conditions it would be better if planting were postponed, but if the condition of the seedlings or other causes necessitate going ahead with the work, the young plants should be shaded from the extreme heat of the sun. Material used for this purpose consists of bracken fern, small leafy branches, or sheets of paper. The latter are to be preferred, and in size are about 12in. by 5in. These are arched over the young plants and kept in position by earth placed on each end. Such protection may be allowed to remain for a number of days until the plants are established. When conditions are favorable for transplanting, the work should go ahead with all speed, and, if available, the employment of additional men to complete setting out in a few days is to be recommended. For average soils the usual spacing of plants is about 1yd. apart in each direction. Under this arrangement slightly more than 5,000 plants are required per acre. In more fertile land they are placed closer together in the rows until about 6,000 are planted per acre. The plants may be set out in the field either by hand or special planting machines. A comparison between the two methods is not possible, both being equally efficient, provided that the latter is used only when the soil is in a suitable condition. It is simply a matter of whether the area to be planted justifies the expense of a machine. However, where areas of above five acres are to be planted, the use of a machine is recommended.



A recently transplanted field.

For hand planting the rows are first marked in some manner, probably the simplest being a light wooden rake with large teeth spaced according to the width of the row desired. Usually such rakes carry about six teeth, and are drawn over the surface of the soil to mark six rows at a time. The planter is provided with a small tool to make the holes; usually a round stick or dibber, or a small garden fork. In the holes thus made he sets the plants and firmly presses the soil around the roots and stem. The plants are placed deeper in the ground than they were originally in the seedbed, but not so deeply as to bury the young growing point of the seedling. Unless wet weather is experienced it is advisable to water each plant immediately after setting out, in order to pack the soil closely around the roots, and help it to become established. Dry earth should be raked over the wet soil to act as a mulch.



The machine effects a considerable saving of time, and is capable of planting an area of from two to four acres per day. For best results the soil must be in a fine state of division, and free of rubbish or stones. Three men are required to manipulate the implement—one to drive, one to prepare the seedlings, and the other to plant. The preparer and the planter sit on the seats at the back of the machine. The preparer on the right hand side gets the plant ready and hands to the planter, who pushes it root downwards into the furrow made by the plough. An indicator gives the signal for planting. At the same time an adjustable quantity of water—usually about a pint—is liberated around the plant roots. (Sometimes a liquid manure is applied by adding 6lbs. to 10lbs. of Nitrogenous fertiliser per 100galls. of water.) The parts of such machines consist of a cask to hold the water, a hopper for the fertiliser, a furrow opener and two long curved steel plates which break up the soil and pack it round the plant, together with the necessary mechanism to provide for the liberation of water and distribution of fertiliser. Unless the land is in first class mechanical condition the steel plates cannot do their work effectively, and, therefore, when a transplanter is to be used special attention must be given to the final preparation of the soil.



The New Idea Transplanting Machine.

#### FILLING IN THE BLANKS.

Several days are required for the young plants to become established, but as soon as possible all that have failed should be replaced by healthy ones freshly drawn from the seedbed. In order to secure a uniform stand and even ripening of the crop, the field should be gone over two or three times during the first fortnight, and plants reset wherever necessary.

#### AFTER TILLAGE.

With a leafy crop, such as tobacco, it is obvious that the plants must transpire a considerable quantity of moisture which the roots have to extract from the soil. Every effort must, therefore, be made to maintain the land in such condition that the minimum amount is lost by evaporation. Not only does good cultivation assist in connection with the conservation of moisture, but also the opening up and aeration of the surface soil plays an important part in promoting healthy development of the plant roots. If this air supply is limited, either by water-logging or neglect in tillage, the growth of the tobacco plant is immediately affected. Emphasis must be placed on the necessity



of thorough after tillage of the crop, more particularly under the rainfall conditions frequently experienced during the summer months in this State, when heavy falls may be widely spaced by rainless periods. In such case, adequate tillage is essential to open up the tightly packed soil, promote aeration, create a surface mulch, and retain moisture for the use of the plants.

The first cultivation should be given as soon after transplanting as the visibility of the rows will permit. A horse hoe or double row cultivator may be utilised, thoroughly stirring the soil at a comparatively shallow depth. All weeds must be kept in check, the space between the plants and against the stem being worked over with a hoe. At the same time any damaged plants which are developing several stems should be pruned back to a single growth. The number of cultivations should not be limited, teams being utilised as long as the size of the plants will permit, and from



Effect of good and bad tillage.

then on tillage continued by hand. However, these later workings may be shallower than those given earlier in the season. The number of workings depends entirely upon the character of the season, and whenever weeds or surface crust renders tillage necessary the operation should be carried out without delay, so that the soil is maintained in first class condition throughout.

#### IRRIGATION.

Irrigation water is preferably applied by means of furrows made between alternate rows of plants. Under this system it is essential that the contour of the land should allow for free movement of the water and prevent accumulation in pools, as the tobacco plant is rapidly destroyed under water-logged conditions. Should it not be possible to adopt this method, because of the grade or depth of sand, hoses may be led to various points and the water reticulated in shorter channels. Overhead sprinklers may also be utilised, but as this method is more likely to encourage the development of fungoid diseases, the furrow system is to be preferred if the soil conditions will permit. Means to irrigate at transplanting time ensures a regular take in the field and less replacements. After the final cultivation of the field, furrows about 4in. in depth should be opened up with the horse hoe at the proper distance apart. The water may then be run down these channels and the plants set out on the edge of the open furrow.



During the growing period water should be applied when necessary, and in light irrigations rather than heavy floodings. After every irrigation the land should be thoroughly cultivated as early as possible, so that the moisture is conserved in the soil. The final watering should not be applied later than the topping stage in the growth of the plant. If given later the ripening of the leaves is delayed, and satisfactory curing rendered more difficult. Water should only be applied when needed, as excess moisture results in the production of poor quality leaves, thin and papery in texture, and with coarse ribs.

An indication of the requirement of the plant for water is the condition of the leaves. If, after a cool night, they tend to droop before mid-day, it is clear proof that there is not enough moisture in the soil, and irrigation should then be resorted to.



An Irrigated Crop.

The irrigation of tobacco has not yet been generally adopted in this State, but it is a common practice in Victoria. Where it has been adopted high yields of good quality leaf have been secured, and it appears to us that every grower should endeavor to provide means for watering if a regular crop is to be anticipated. The tobacco grower is placed in exactly the same position as the producer of early potatoes in the Adelaide Hills, inasmuch as experience has proved to him that the provision of irrigation water is an economic proposition, but he only irrigates when the character of the season renders such action necessary. All producers of tobacco in South Australia are strongly urged to endeavor to obtain means for irrigation, thus ensuring regular development throughout the life of the plant, and, consequently, better quality leaves. It is obvious that any check in plant growth will affect quality, and provision for irrigation in low rainfall years, or between long rainless periods, must lead to improvement in this respect.



## SELECTION OF SEED PLANTS.

Before topping the tobacco crop should be carefully examined, and if it is desired to save seed, the plants of outstanding merit should be marked for this purpose. If the selection is being made from a crop grown from purchased seed, only a limited amount should be saved, as the plants may not be fully acclimatised. However, the grower should always be searching for desirable plants which appear to suit his soil and climatic conditions. From the best of these he would select seed for testing, comparatively with his bulk crop. Shortly before topping several of the best plants should be staked and allowed to develop seed heads. At maturity the individual plant which appears to be best suited to his requirements would be selected. The plant chosen should be healthy, true to type, and early maturing. The leaves should be numerous, of good size, shape, and texture, and appear likely to cure into good quality tobacco. The seed from this plant would be his top selection, and any other grain harvested



Flowering head of selected seed plant covered to prevent cross fertilization.

would be utilised for the ordinary field crop. The seed head should be covered with a cheese-cloth bag, in order to prevent cross-fertilisation. The suckers should be removed, together with a few of the smaller leaves, from immediately below the cluster of flowers. The removal of these leaves prevents the plant from becoming top heavy. The covering should be tied just below the flowering branches, and from time to time must be loosened as the flowers develop. When the seed heads turn brown the grain is sufficiently ripe, and the head may then be cut off with the covering still attached. After careful labelling it should be hung in a dry place until wanted, when the seed may be threshed out by rubbing in the hands.

## TOPPING.

When the plants show signs of bursting into flower the seed head and topmost portion of the stem carrying the smaller leaves should be removed by breaking off with the fingers. This operation is termed topping, and is carried out with the object of improving the quality of the leaf by forcing all the goodness which the plant can extract from the soil into the leaves which are saleable. It is not desired that the energies of the plant should be wasted on the production of seed, whilst very small leaves are of no commercial value.



Topping is really a pruning process, and consists of retaining as many leaves of sufficient size as the vitality of the plant will permit. The number may vary from 4 to 18, with a general average of about 8 or 10. As a rule, the topmost leaf left on the plant should be about a foot in length, and 4in. to 6in. in width. A leaf of these dimensions will, after curing, shrink to about the size limit accepted by manufacturers who, because of the fact that much work in the factory is done as piecework, do not desire small leaves, which necessitate additional labor.

With normal treatment the leaves commence to ripen some three to four weeks after this operation, but with high topping the general life of the plant is prolonged, whilst, on the other hand, heavy topping hastens maturity. Therefore, the height will vary with circumstances. A late crop is usually heavily topped to assist in ripening, whilst an early crop, or one on more fertile land, may be only lightly treated. Further, a tobacco field frequently contains plants in various stages of growth, and in this case variation in topping, such as light treatment of the early plants, allows for more uniform ripening of the leaf.



**Topped Tobacco Plants.**

#### TRIMMING.

This consists of removing the three or four over-ripe, sanded, or damaged leaves from the base of the plant. The operation is advocated by some on the ground that it destroys the hiding places of injurious insects, but it is doubtful if the expense of this work is justified. If left on the plant they shelter the surface soil and protect the leaves above them from damage. The usual time for trimming is when the plants are being topped.

#### DESUCKERING.

Shortly after topping suckers, or lateral growths, will spring from the axis of the leaf with the stem. These should be rubbed off when long enough to handle without difficulty, which is usually when about 3in. in length. If left until they have made more growth they rob food from the leaves which are to be harvested, thus lowering the yield and reducing the quality. The plant is persistent in its efforts to develop sucker growths, on which seed heads would be formed, and it is necessary to desucker two or three times between topping and harvesting. Should wet weather be experienced shortly before harvesting, these lateral growths may be allowed to remain, as they then



absorb moisture and food which would otherwise be forced into the marketable leaves, causing them to become coarse in texture and more difficult to cure to a satisfactory color.

#### RIPENING.

It is essential that the leaf be thoroughly ripe before harvesting, and at times growers have sustained considerable losses by picking the crop before it is fully matured. In the process of ripening the green coloring matter is gradually reduced and the leaf tends to assume a yellowish shade. One of the principal factors in determining the cash value of tobacco is the proportion of bright colored leaf, and, therefore, every grower should aim at thorough ripening, so that the leaves contain as little green coloring matter as possible. Under suitable conditions, and particularly with varieties of the Burley type, the leaves assume a full yellow color on ripening, but as a rule the Virginian types change to a mottled, pale yellowish-green shade. The higher the proportion of yellow the easier the leaf is to cure. On the other hand, the heavier or more fertile soils yield leaves carrying a greater percentage of green color. When fully ripe the leaves tend to droop, become rough, slightly sticky, thicken, and color up as described. The flesh becomes crisp and snaps easily when folded between the finger and thumb, whereas a green leaf carries tissue which is tough and pliable.



A Crop of Ripe Tobacco.

Over-ripeness is indicated by the appearance of brown spots which rapidly increase in area. If this coloring is noticed the leaves affected should be harvested without delay, otherwise they quickly deteriorate in quality.

Ripening commences about three to four weeks after topping, the bottom leaves maturing first and the upper leaves last. In normal weather the ripening period extends over six to eight weeks, and allows for about five pickings from each plant, but with heavy topping the crop matures more rapidly.

Tobacco is only able to properly mature when weather conditions favor the removal of green coloring matter and the fixing of starch in the leaves. For best results the plants should have completed their growth by the middle of February, so that the warmth of late summer and early autumn can bring about this desirable result. Therefore, growers should avoid late December plantings, which are detrimental to good ripening. For the same reason late rains or cool autumn weather, which promote growth, are injurious to the production of good quality leaf.



### FLUE CURING.

Only leaf cured in a proper barn under controlled temperature is saleable. Therefore, every grower must arrange to have his leaf cured, and probably the most satisfactory plan is for each man to erect barns for curing his own crop. It is the most important operation in tobacco culture, as first quality leaf harvested from the field may be completely ruined, or at any rate greatly depreciated in value by bad curing.

Briefly, the object of curing is to promote chemical changes in the leaves which will lead to improvement in color, aroma, flavor, and texture. It is more than merely drying out the leaf, and is an operation which can only be thoroughly learned by practical experience.

So many variations occur regarding the condition of the leaf placed in the barn, climate of the district, variety, &c., that only a general outline of the operation can be given. Therefore the times and temperatures quoted must not be accepted as correct for all cases, but only to serve as a guide. Every grower should keep a complete record of his curing operations so that he has a diary to which he can refer when outstandingly good results are obtained.

### HARVESTING.

It is important that only ripe leaf should be harvested, and personal supervision of the picking operations is greatly to be desired. Green leaf will never cure satisfactorily, the flavor being bitter and objectionable. Palatable tobacco can never be produced, and no process of curing or manufacturing can overcome the objectionable features. Enough leaves of uniform ripeness should be available for filling the barn in one day. A barn containing leaf in various stages of maturity, even if well cured, will grade irregularly, and, therefore, will not produce maximum quantity of top grade leaf. Tobacco should not be harvested immediately after rain, as washing causes loss of essential gum which puts body and elasticity into the leaves. However, nature quickly restores this substance, and after a few days it is quite safe to continue harvesting. For the same reason leaves should not be picked when either wet with rain or with heavy dew. On the other hand, leaf harvested in extreme heat is tending to wilt, and under such circumstances is inclined to cure out with permanent greenish patches. The best time for picking is on cloudy, warm days, when the leaves are dry and slightly sticky or gummy. The single leaf system of picking should be adopted, and the leaves removed as they ripen from the bottom of the plant upwards. As many as four leaves may be ready at the one time, and the plant is visited at intervals until all have been harvested.

Care must be exercised in handling, as leaves which are bruised or stacked for any length of time will not cure satisfactorily. A good plan is to lay the leaves on sheets of hessian about 6ft. square, and when filled gather up by the corners and place on the trolley or dray.

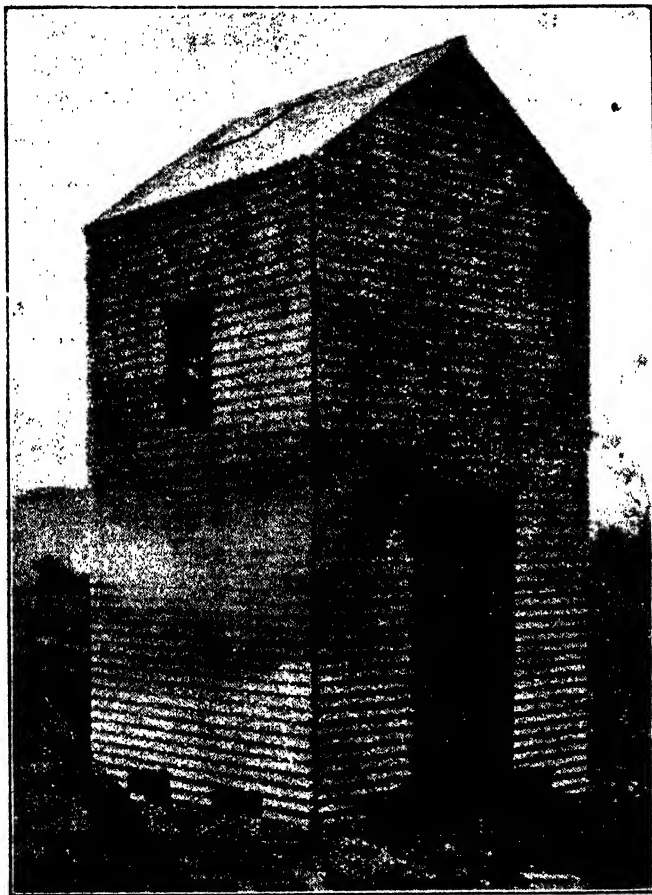
In the Adelaide Hills the harvest usually extends from about mid-February to mid-April. Crops ripening later than this are of poor quality and difficult to cure.

### TYING.

After the leaves have been conveyed to the barn they are fixed to sticks ready for hanging. The sticks used for the purpose are of such length as to rest across the bearers without overlapping, and, as a rule, in most barns are approximately 4ft. They may be of any hardwood, sometimes wattle sticks, but preferably sawn battens either 1in. by 1in., or 1in. by 2in. in cross-section. When the leaves are attached by



string, battens of the former dimensions are secured, whilst if fixed on wires the sticks of greater width are utilised in order to prevent tipping should the leaves cure out to a greater weight on one side than the other. The wired stick method for attaching the leaves is preferred, as under this arrangement they are evenly spaced, and allow for free movement of air, thus avoiding danger of discoloration from sweating. Sharpened No. 12 gauge galvanized steel wires are threaded through holes on the stick to project about 7in. on either side. They are spaced about 6in. apart,



Small Curing Barn, Experimental Field, Mount Barker.

and a similar distance from the end. About eight leaves are threaded on each. When complete the stick carries from 110 to 130 leaves, and is placed in the barn so that the wire points almost touch those of the next. The stringing system is more popular, as it allows for quicker work and easier handling of small leaves. Thin twine is used for the purpose. It is fixed about 4in. from the end of the stick, and the leaves in bundles of two or three, according to the size, tied on alternate sides. A bunch is placed close to the stick, and the twine looped round the stems. The next bunch is placed on the opposite side and the string carried across to loop round the butt in the form of a figure 8. This is continued along the length of the stick, each bundle about 4in. apart, making about 25 in all, and the string finally tied or slipped in a slot at the opposite end. •



## BARNs.

Curing barns can be built of stone, brick, concrete, galvanized iron, wood, &c., but whatever the material utilised, special attention must be given to the means for heating and ventilating.

As the curing process demands great and even distribution of heat, two furnaces are preferable to a single fire. Details of the arrangement are shown in the accompanying plans. To ensure humid conditions during the first stages of curing, the building should be as airtight as possible, and the ventilators and door tight fitting. However, in the later stages, a free draught of air is required. The ventilators should be sufficiently large for this purpose, and also permit of easy regulation. Various systems of ventilation are in vogue, some curers favoring a complete ridge cap vent, and others a butterfly type, or ordinary hinged ventilator, but whatever system is adopted it is important that the operator should have complete control over the opening or closing



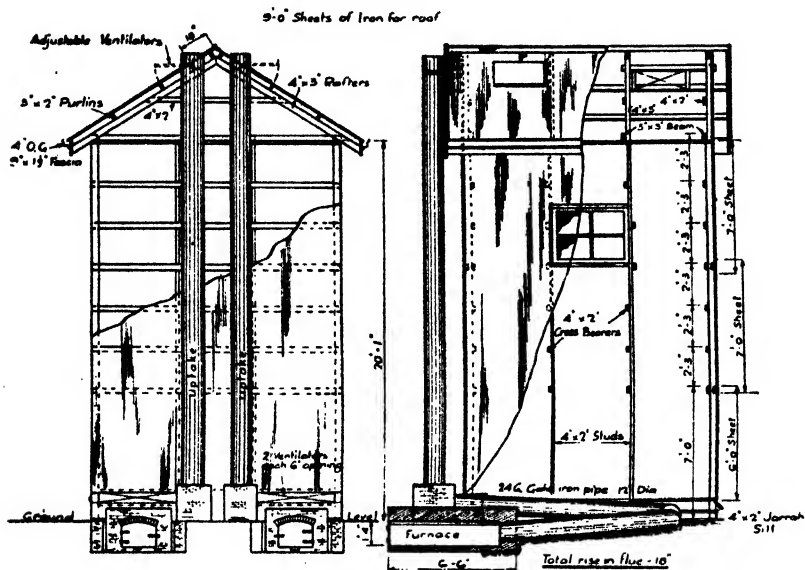
Tobacco Barns, Paris Creek.

of the vents. As a rule barns are approximately 20ft. in height, and 12ft. to 16ft. square on the base. Such dimensions allow the bulk of the leaf to be hung where the humidity accumulates, whilst the chimney-like shape is conducive to the creation of a draught. With a lower roof the proportion of space lost is increased, since leaf cannot be hung closer than about 7ft. from the flue pipes. A modification of this style is what is known as the Dug Out Barn, in which a hole is taken out from the ground about 6ft. deep over the full floor space, and then walled up with concrete or other material. On this the barn is erected to a height of 12ft. to 14ft., and the door made at ground level opposite the tiers on which the leaf is hung. The fireplace is constructed on lines similar to those used in lime kilns, and the vents situated a little higher than is the case with high barns. In this type a considerable saving of labor is effected when filling and emptying.

In this State galvanized iron is the most popular material used in the construction of a curing barn, the building being lined with plain galvanized iron, and the hollow wall space filled with sawdust or charcoal.

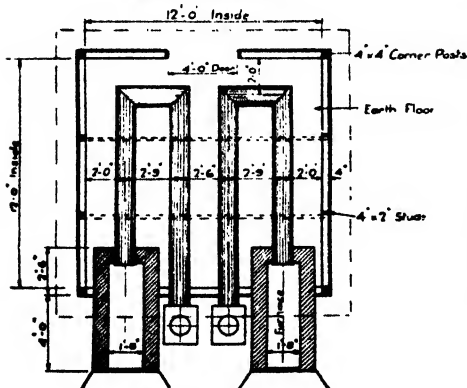
A building erected according to the plans and specifications on the following pages is capable of handling the leaf from a 4 to 5 acre crop, whilst a 16ft. by 16ft. by 20ft. high building could cope with the produce from 6 to 8 acres.



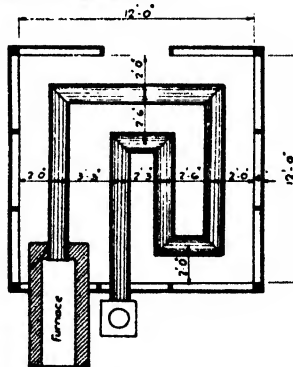


### BACK ELEVATION

### SECTIONAL ELEVATION



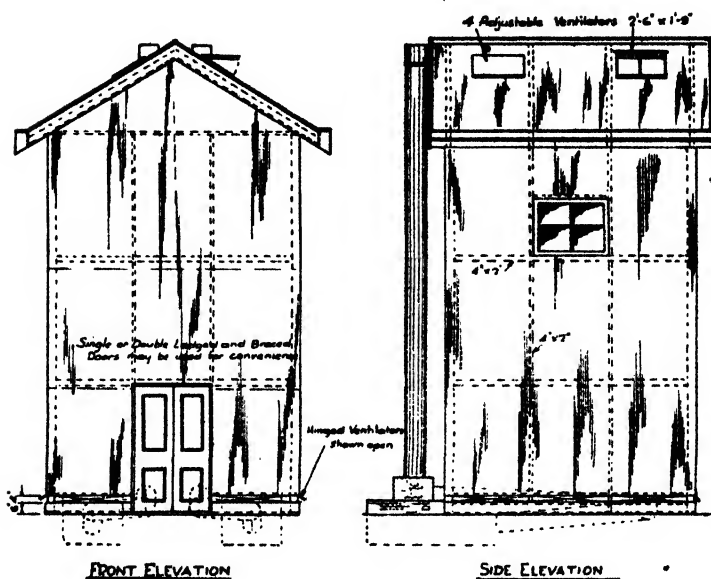
### SECTIONAL PLAN



### ALTERNATIVE PLAN

**TOBACCO CURING BARN.**





NOTE: Exterior of building to be covered with 26g Corrugated Galv. iron.  
 Interior . . . lined with plain galv. iron.  
 The cavity between the exterior & interior iron to be filled with sawdust and charcoal.

TOBACCO CURING BARN.



## SPECIFICATION OF GALVANIZED IRON BARN.

*Materials for Tobacco Curing Barn.*

| No. of Pieces. | Material. | Size.            | Length.            | Description.                              | Total Super Feet. |
|----------------|-----------|------------------|--------------------|-------------------------------------------|-------------------|
| 4 .....        | Oregon    | 4" x 4"          | 20' 0" .....       | Building corner posts .....               | 107               |
| 8 .....        | Oregon    | 4" x 2"          | 20' 0" .....       | Building studs .....                      | 107               |
| 24 .....       | Oregon    | 4" x 2"          | 12' 8" .....       | Cross beams .....                         | 203               |
|                | Oregon    | 4" x 2"          | 96', cut to suit.. | Rails to nail outside corr. galv. iron to | 64                |
| 8 .....        | Oregon    | 4" x 2"          | 12' 0" .....       | Rails forming ground ventilators          | 64                |
| 4 .....        | Jarrah    | 4" x 2"          | 12' 8" .....       | Sills on ground .....                     | 34                |
| 4 .....        | Oregon    | 4" x 2"          | 12' 8" .....       | Top plates .....                          | 34                |
| 4 .....        | Oregon    | 4" x 2"          | 7' 6" .....        | Cross bearers across principals           | 20                |
| 8 .....        | Oregon    | 4" x 3"          | 9' 0" .....        | Rafters .....                             | 72                |
| 4 .....        | Oregon    | 5" x 3"          | 13' 6" .....       | Tie-beam .....                            | 68                |
| 6 .....        | Oregon    | 3" x 2"          | 14' 6" .....       | Purlins .....                             | 44                |
| 2 .....        | Oregon    | 9" x 1½"         | 14' 6" .....       | Fascia .....                              | 29ft., lin.       |
| 4 .....        | Oregon    | 10" x 1½"        | 10' 0" .....       | Barge boards .....                        | 40ft., lin.       |
|                | Jarrah    | 7' Weather board | 43', cut to suit.. | Ventilator, flap doors (cut to 4" wide)   | 43ft., lin.       |
| 2 .....        | Oregon    | 4" x 2"          | 4' 0" .....        | Window framing .....                      | 6                 |
|                | Oregon    | 4" x 2"          | 34', cut to suit.. | Top ventilator framing .....              | 23                |
|                | Oregon    | 3" x 1½"         | 34', cut to suit.. | Top adjustable ventilators ..             | 13                |
|                | Oregon    | 4" x 1½"         | 38', cut to suit.. | Capping over barge boards ..              | 19                |
|                |           | 3" x 1½"         | 160', cut to suit  | Nailing internal galv. sheets to          | 56                |

14 sheets of 9ft. corr. galv. iron, 24 gauge, roof.

48 sheets of 7ft. corr. galv. iron, 26 gauge, sides.

28 sheets of 6ft. corr. galv. iron, 26 gauge, sides.

62 sheets of 6ft. x 3ft. plain galv. iron, 26 gauge, lining and ceiling interior.

15ft. of 14in. ridge capping.

30ft. of 5in. O.G. guttering.

96ft. of 12in.d-24 gauge galv. iron piping, and 73ft. for alternative scheme.

*Doors.*—Door opening, 6' 8" x 4' 0", for double or single doors.

*Windows.*—2 fixed windows, 4' 0" x 3' 0", 4-light.

*Furnace.*—May be built of bricks or suitable stone.

*Concrete.*—Barns constructed with this material are not subject to fire, nor are they affected by climatic changes. They maintain an even inside temperature with little attention, and form a very substantial and dual purpose farm improvement. Concrete barns, however, are liable to cause trouble, because the walls have a tendency to absorb moisture.

With a concrete barn, special care should be exercised in placing the reinforcement rods, which are set at 12in. centres both ways, and well turned at the corners and tied.

Concrete mixture: 1 - 2 - 4, with walls 6in. thick.

7cwts. ¾in. reinforcement rods and 4in. x 2in. cross bearers are required.

Roof, furnace, flues, doors, and windows similar to wood-and-iron specification.

*Stone.*—40 cubic yards of masonry are required, with 4in. x 2in. cross bearers.

Roof, furnace, flues, doors, and windows similar to wood-and-iron specification.

*Weatherboard.*—This is quite a suitable material and can be cheaply erected, because in most cases the farmer is able to do the construction work. It is important, however, that a barn of this description be lined. It is suggested that building paper, placed in position before the boards are nailed, be used for this purpose. With weatherboard, great care must be taken to avoid danger from fire and as a precaution, the first few feet over the fireplace should be constructed with bricks.

For the above plans and specifications we are indebted to Mr. T. O. Carlisle, of the Hydraulic Engineer's Department.

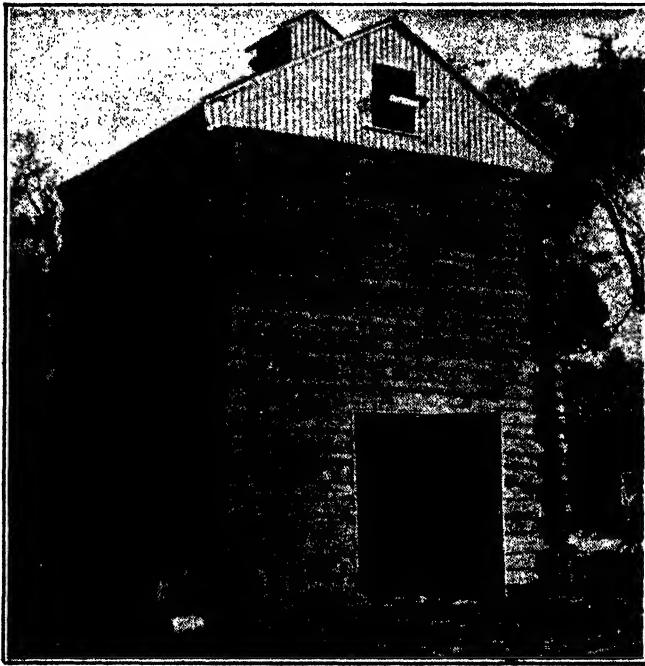


#### FILLING THE BARN.

A standard barn of 12ft. by 12ft. by 20ft. will take approximately 300 sticks, each placed about 8in. apart on the tiers, and will cure from 300lbs. to 500lbs. of tobacco, according to the length and quality of the leaf handled.

It is most important that the leaf should be picked and the barn filled in the one day, otherwise the curing will not be uniform. If this is not possible, all leaf should be picked on the first day ready for filling in the second, and the last harvested placed in the top of the barn. However, unhung leaf kept overnight should be stacked in single rows, not more than a few inches in height, in order to prevent heating.

Should there be any lack of uniformity in ripeness, the more immature leaves should be hung in the top tiers, where the humidity is greater.



Log Curing Barn.

#### THE CURING PROCESS.

This involves three distinct stages, namely:—

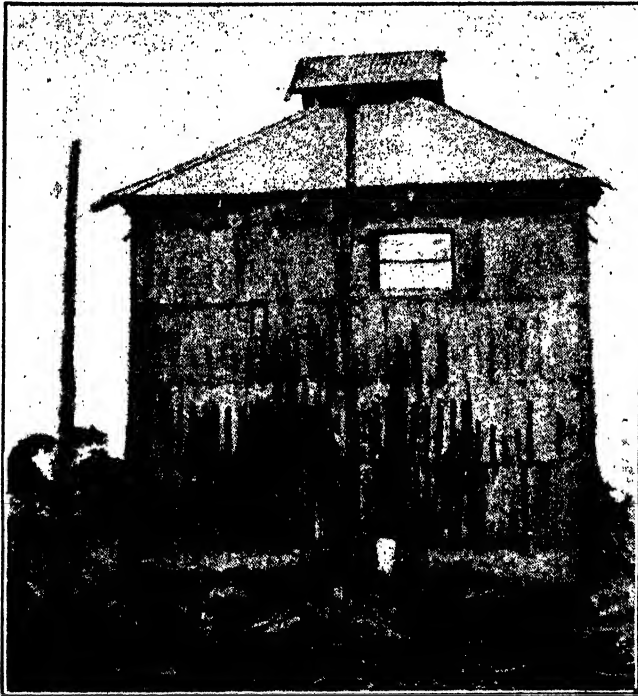
1. Yellowing of the leaf.
2. Fixing the color.
3. Drying the leaf.

Immediately after the barn is filled the fires should be started, all ventilators closed, and two thermometers (a wet and dry bulb) hung in the centre of the first tier of leaves. The two thermometers are necessary so that the temperature and humidity of the barn may be ascertained. It is the humidity which is the most important factor in the process of yellowing the leaf. Both thermometers should be capable of reading to 200° F. and attached to a board or solid foundation. They should be set about 2in. apart, making sure that the readings are level, and the mercury bulb of one wrapped with woollen wick leading to a small bottle of water fastened about 1in. below the thermometer. The difference between the readings will then show the humidity of the atmosphere.

It is of advantage if the process of curing can be commenced in the evening, as then the various stages usually occur at more convenient times. Further, it is difficult to accurately gauge the color of the leaves in an artificial light, as they always appear more green at night.



**Yellowing the Leaf.**—Under average conditions this will take about 40 hours, but will vary within very wide limits. The fires having been started the temperature, as indicated by the dry bulb thermometer, should be raised to about 90° F., or 10° F. above the outside temperature. The time taken to reach this heat should be from four to five hours. About seven hours after the lighting of the fires the leaves should commence to sweat, and create a sufficiently humid atmosphere to cause the wet and dry bulb thermometer to register a difference of 3° F. to 4° F. If the barn is airtight, the leaves may supply sufficient moisture, but if such is not the case, artificial steaming must be provided. The usual method of raising the humidity is to place wet bags over the flue pipes, or to dampen the floor. The former is to be preferred, because, in the case of the latter, any excess moisture cannot be quickly removed. Owing to the danger from fire if the wet bags are allowed to dry right out, they should not be laid



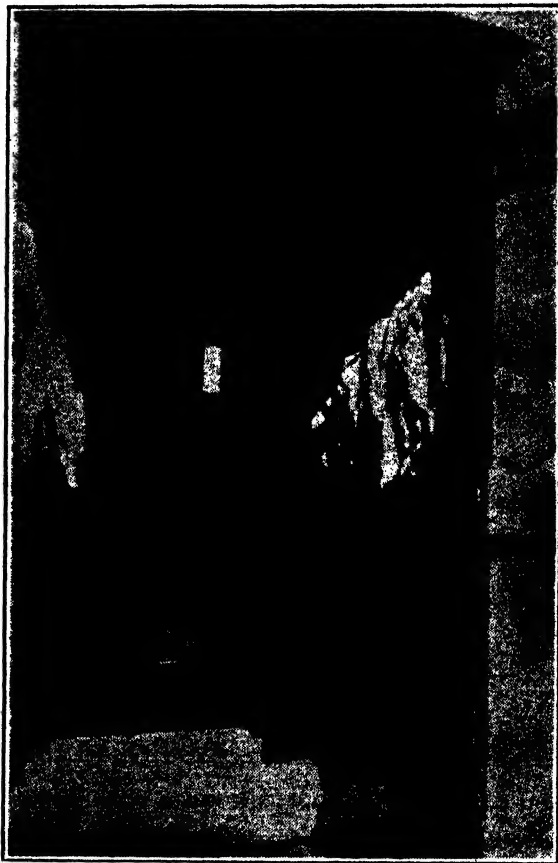
Barn in the process of erection, built of slabs of timber and mud.

on the pipes, but suspended on a strip of wire-netting erected immediately over the flues. In addition, the wire-netting lessens the risk from fire, as it will catch leaves which may fall from the sticks on to the hot piping. The temperature must be kept at 90° F. until the leaf commences to yellow at the tip and round the edges. It should then be raised at the rate of 2½° F. per hour till it reaches 95° F., where it should be held until the yellowish shade spreads from the edges towards the centre of the leaf. When this occurs the temperature may be raised at the same rate to 100° F. This heat must be maintained until the yellow color is more pronounced and the leaf assumes a light pea-green shade. It is most important that the curer should not hurry past this stage, otherwise the green matter will become fixed in the leaves and cause a marked depreciation in value. On the other hand, if allowed to become too yellow the leaf may not be able to hold this shade when passing through the other stages, and become a dark-brown color before the drying out is complete.

**Raising the Color.**—When, in the judgment of the curer, the majority of the leaves have yellowed sufficiently, the temperature may be raised to 110° F. at the rate of about 2½° F. per hour. At 105° F. the top vents should be lifted a little, and at 110° F.



both top and bottom vents slightly opened. At the commencement of ventilation some of the humidity will be lost, and the difference in the readings of the wet and dry thermometers should increase at the rate of 2° F. for every 5° F. rise in temperature. Thus at 110° F. the difference should become 7° F. to 8° F. The barn must be held at this temperature until there is only a slightly greenish tinge at the base of the leaves, whilst the tips have curled and become dry. Having attained this shade, the next step is to fix the color. This is the most difficult period in the process of curing, as experience is needed to be able to adjust the heat and ventilation so that the moisture is removed just as quickly as it can escape from the leaf. Should the curing be proceeding too rapidly, dark-reddish colored patches will appear, whilst if too slowly, moisture will



Interior View of Tobacco Curing Barn.

condense on the leaves and give rise to greyish-brown blotches. This latter marking is known as sponging, and the former as reddening or scalding. Whilst sponging is undesirable, it is preferable to scalding, and is caused by insufficient temperature and ventilation. On the other hand, scalding is due to excessive ventilation and too rapid increase in temperature.

In the process of fixing the color the top and bottom ventilators must be gradually opened, and the temperatures slowly raised to 115° F. This heat is maintained for from four to six hours, and then increased to 120° F. and held for the same time. It is next brought to 125° F., and finally to 130° F., where it is held until the whole of the blade of the leaf is dried out. During the period of fixing the color, close attention must be given to the work. With correct temperatures and ventilation the tips of the leaves will feel soft if brushed with the hand, whilst if sticky the ventilation



should be increased. Should there be signs of scalding, which first appear on the edges and thin parts of the leaf, the temperature should be lowered by several degrees and kept there for three to four hours before being again raised.

*Drying the Leaf.*—At this stage only the larger veins and midrib are moist, the remainder of the leaf being dried out whilst fixing the color. The bottom vents must be partially closed and the temperature raised at the rate of 5° F. per hour until 170° F. is reached, where it is maintained until the midribs are thoroughly dry. This condition is indicated by the ease with which they will snap when leaves taken from the corners or sides of the barn, where drying is slower, are tested. Any neglect in this direction will result in the development of mould in the bulked leaf, and if this is noticed it must be immediately returned to the barn and dried out.

CURING TABLE.

| Condition.                            | Temperature.<br>Degrees F. | Time.<br>Hours. | Remarks.                       |
|---------------------------------------|----------------------------|-----------------|--------------------------------|
| <i>Fill barn in one day</i> . . . . . | —                          | —               | Light fires in evening.        |
| Ripe fresh leaf . . . . .             | 90                         | 4               | After lighting fires.          |
| Sweat commences . . . . .             | 90                         | 6-7             | After lighting fires.          |
| Leaf yellow round edges . . . . .     | 90                         | 12-30           | Humidity 3° F. to 4° F.        |
| Yellow spreads . . . . .              | 95                         | 6-12            | Humidity 3° F. to 4° F.        |
| Yellowish pea-green color . . . . .   | 100                        | 6-24            | Humidity 3° F. to 4° F.        |
| Yellow more pronounced . . . . .      | 105                        | 2-6             | Open top vents slightly.       |
|                                       |                            |                 | Humidity 5° F. to 6° F.        |
| Practically yellow . . . . .          | 110                        | 2-6             | Humidity 7° F. to 8° F.        |
|                                       |                            |                 | Open top vents more.           |
|                                       |                            |                 | Open bottom vents a little.    |
|                                       |                            |                 | Gradually open vents.          |
| Fixing color . . . . .                | 115                        | 4-6             |                                |
| Fixing color . . . . .                | 120                        | 4-6             |                                |
| Drying web . . . . .                  | 125                        | 4-6             | Ventilators open full.         |
| Drying web . . . . .                  | 130                        | 4-6             |                                |
| Drying ribs . . . . .                 | 135                        | 1-2             |                                |
| Drying ribs . . . . .                 | 140                        | 1-2             |                                |
| Drying ribs . . . . .                 | 145                        | 1-2             |                                |
| Drying ribs . . . . .                 | 150                        | 1-2             |                                |
| Drying ribs . . . . .                 | 155                        | 1-2             | Bottom vents partially closed. |
| Drying ribs . . . . .                 | 160                        | 1-2             |                                |
| Drying ribs . . . . .                 | 165                        | 1-2             |                                |
| Drying ribs . . . . .                 | 170                        | 12-18           |                                |

## VARIATIONS IN CURING.

The above table is only intended to serve as a guide, and in practice many variations will occur which must be dealt with by the curer. Leaf which yellows well in the field, as is the case with some varieties, particularly when grown in light-textured soils, can be cured quickly, since it does not require the same length of time to assume the desired color as does greener mottled leaf of heavier texture. Leaf picked during wet seasons or in moist atmospheric conditions is difficult to dry out, and may give rise to excess humidity. Under such circumstances the top vents must be opened early and the moisture driven off. As the yellow color commences to appear, so should the ventilators be gradually opened, with the result that the drying and curing should be both going on at the same time. In consequence, the temperature should not be raised above 110° F. to 120° F. before the best possible color is obtained. Again, late ripening crops have frequently to be maintained at about 85° F. for 48 to 72 hours until the yellow color appears.

## CONDITIONING LEAF.

On the completion of curing the leaf will be dry and brittle, and must, therefore, be conditioned before it can be handled without damage. Wet bags placed over the hot flue pipes will give rise to steam, which is quickly absorbed by the leaves, thus allowing them to be removed about two hours later. If the barn is not urgently required for the next cure, the fires should be drawn and all vents, doors, and windows opened to the night air, when, under ordinary climatic conditions, the tobacco will be sufficiently pliable for handling next morning.

(To be continued.)



## FARM BACON CURING.

[By R. BAKER, R.D.A., Dairy Superintendent, Roseworthy Agricultural College.]  
(Published at the request of the Owen Branch of the Agricultural Bureau.)

The purpose of this article is to give in a very concise and brief form the directions needed by those inexperienced in the art, to enable them to attempt the home curing of bacon.

No attempt is made to elaborate the more technical details of the trade side of the subject, which abounds in refinements. By following these instructions, however, the average farmer should be able, with very little expense for equipment and materials, to turn out a thoroughly palatable product of sound keeping quality.

### CLASS OF PIG.

The pig should be healthy, in good condition, and gaining weight at the time of slaughtering. The live weight should be from 160lbs. to 175lbs., which gives a dressed weight of approximately 110lbs. to 125lbs. Heads and trimmings account for a loss of about 20lbs., and there is a loss during curing of approximately 20 per cent., so that the weight of the final product ranges from 75lbs. to 85lbs. per pig in the range of live weights specified.

### SLAUGHTERING.

Before slaughtering, the pigs should be starved from 12 to 24 hours, and care should be taken to avoid rough handling, which causes bruises and discoloration in the finished article. Stun with any blunt instrument and cut the throat to allow of free bleeding. Care should be exercised in doing this to avoid sticking the inside of the shoulder, or otherwise injuring the flesh internally.

### SCALDING.

A vat of some kind is necessary, and this should contain sufficient water to cover the carcass. The temperature of the water should be 145-150 degrees Fah. In the absence of a thermometer a common test is to drop in a drop of fresh blood which will immediately coagulate if the water is hot enough. Care must be taken, however, not to have the water too hot. Keep the carcass moving while in the water and scrape off the bulk of the hair and the thin outer skin by using a scud or scraper. Finish scraping with a sharp knife in the presence of cold water. Remove hoofs with any sharp-pointed instrument.

### DRESSING.

The carcass is then hung for dressing. Remove the flare or abdominal fat as well as the entrails, &c. Allow to hang, say, overnight for the purpose of cooling off and setting.

### CUTTING UP.

The head is removed by cutting across lin. behind the ears, and the backbone by cutting down on either side with a saw or chopper. If for sides, merely trim up and remove the trotters; if curing in pieces, in addition, cut off the ham to a convenient size and shape, cut off the shoulder, and from the remainder remove the ribs and make into a roll. Trimmings require removing from all pieces. If dry salting is to be adopted it is as well to break the joints of the ham to allow freer access for the salt.

### EQUIPMENT FOR CURING.

A clean wooden barrel is a suitable vessel in which to cure the meat when using brine. For dry salting a clean cement floor or strong table is suitable for stacking the flesh upon. The temperature of the room should not exceed 60 degrees Fah.



**PRESERVATIONS.**

The pickling mixture consists of salt, saltpetre, and sugar. Salt alone has hardening effect and tends to bleach the natural color. Saltpetre preserves the natural color, but should not be used to a greater extent than 1lb. to 20lbs. salt. Sugar has a softening effect and imparts flavor. Baking powder used in small quantities will sweeten brine and prevent it from spoiling during warm weather.

**DRY SALTING RECIPES.**

1. 10lbs. salt, 4ozs. saltpetre to every 100lbs. of meat.
2. 10lbs. salt, 4ozs. brown sugar, 2ozs. allspice, 2ozs. saltpetre to every 100lbs. flesh.

**BRINE RECIPES.**

1. 20lbs. salt, 1lb. saltpetre, dissolve in 10galls. water and allow to cool before using.
2. 20lbs. salt, 1lb. saltpetre, 8lbs. brown sugar, 2ozs. allspice. Boil in 10galls. water and use when perfectly cold. Allspice should be in linen bag.

**CURING.**

First rub with a mixture of salt and saltpetre once a day for first three days, placing the pork in a stack with flesh downwards to allow draining of blood. After the third day either practise dry salting or brine curing.

**DRY SALTING.**

Sprinkle the pieces each day with the recipe, placing them in a stack with the flesh upwards, change the position of the pieces each day, working the salt into the flesh by working the joints of the hams and shoulders. It generally takes three weeks to cure by this method.

**BRINE CURING.**

Pieces are placed in brine after the third day, changing the position each day and working the joints. This also takes three weeks.

**SMOKING.**

The flesh is prepared for smoking by removing all undissolved salt and allowing to soak in cold water for 24 hours. Hang in a cool draught until dry. Surround the meat with a heavy smoke at a low temperature for two to four days. Hardwood sawdust makes good, clean smoke. A firepot outside, with flue to carry the smoke to a large box or barrel, will be found convenient. Care should be taken to prevent meat from becoming overheated.

## **TOBACCO SEEDLINGS.**

One of the main difficulties in tobacco growing is the raising of the plants from the seed. Why not leave this to the experts and save disappointment?

**The Smyrna Figs Estates (Barmera) Limited**  
**CAN SUPPLY YOUR NEEDS.**

A letter to the Manager, P.O. Box 23, Barmera, will reserve your tobacco plants and give you any information you require.

**EARLY APPLICATION IS NECESSARY.**



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1931-32.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1, White Leghorns—141 birds. Section 2, Black Minorca—9 birds. Section 3, Black Orpington—57 birds.

Twelve Months Test. To start on April 1st, 1931.

## Section 1.—White Leghorns.

| Competitor.             | Address.           | Score for Month ended May 31st, 1931. |                         |                         |         |
|-------------------------|--------------------|---------------------------------------|-------------------------|-------------------------|---------|
|                         |                    | Bird No. and Eggs Laid.               | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Barker, C. R. ....      | Edwardstown. ....  | (1) 43                                | (2) 48                  | (3) 45                  | 136     |
| Hartmann, S. ....       | Salisbury ....     | (4) 32                                | (5) 30                  | (6) 39                  | 101     |
| Hartmann, S. ....       | Salisbury ....     | (7) 33                                | (8) 33                  | (9) 34                  | 100     |
| Cooper, F. E. ....      | Edwardstown. ....  | (10) 17                               | (11) 13                 | (12) 35                 | 65      |
| Cooper, S. ....         | Edwardstown. ....  | (13) 39                               | (14) 36                 | (15) 23                 | 98      |
| Cooper, S. ....         | Edwardstown. ....  | (16) 8                                | (17) 24                 | (18) 33                 | 65      |
| Hutton, Mrs. M. E. .... | Clarence Park .... | (19) 37                               | (20) 41                 | (21) 24                 | 102     |
| Easther, C. J. ....     | Black Forest ....  | (22) 32                               | (23) 41                 | (24) 45                 | 118     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (25) 33                               | (26) 36                 | (27) 42                 | 111     |
| Tolhurst, A. E. ....    | Torrens Park ....  | (28) 40                               | (29) 29                 | (30) 24                 | 93      |
| Fidge, H. ....          | Clarence Park .... | (31) 20                               | (32) 45                 | (33) 26                 | 91      |
| Fidge, H. ....          | Clarence Park .... | (34) 1                                | (35) 37                 | (36) 14                 | 52      |
| Burton, C. J. C. ....   | Mallala ....       | (37) 31                               | (38) 41                 | (39) 36                 | 108     |
| Earl Bros. ....         | Mallala ....       | (40) 16                               | (41) 26                 | (42) 9                  | 51      |
| Duhring, T. ....        | Mallala ....       | (43) 33                               | (44) 25                 | (45) 28                 | 86      |
| Stanton, L. O. ....     | Warradale ....     | (46) 39                               | (47) 31                 | (48) 27                 | 97      |
| Barrett, L. ....        | Angaston ....      | (49) 32                               | (50) 42                 | (51) 38                 | 112     |
| Kappler, C. E. ....     | Ascot Park ....    | (52) —                                | (53) —                  | (54) —                  | —       |
| Kappler, C. E. ....     | Ascot Park ....    | (55) 1                                | (56) —                  | (57) —                  | 1       |
| Harnden, W. R. ....     | Kersbrook ....     | (58) 19                               | (59) 24                 | (60) 20                 | 63      |
| Lamerton, E. A. ....    | Edwardstown. ....  | (61) 10                               | (62) 35                 | (63) 30                 | 75      |
| Williams, W. R. ....    | Frewville ....     | (64) 35                               | (65) 31                 | (66) 27                 | 93      |
| Heath, H. E. ....       | Mile End. ....     | (67) 27                               | (68) 26                 | (69) 31                 | 84      |
| Gurr, A. & H. ....      | Scott's Creek .... | (70) 40                               | (71) 37                 | (72) 4                  | 81      |
| Gavin, G. C. ....       | Salisbury ....     | (73) 18                               | (74) 8                  | (75) 17                 | 43      |
| Gavin, G. C. ....       | Salisbury ....     | (76) 19                               | (77) 4                  | (78) 41                 | 64      |
| Gavin, G. C. ....       | Salisbury ....     | (79) 29                               | (80) 37                 | (81) 25                 | 91      |
| Gavin, G. C. ....       | Salisbury ....     | (82) 34                               | (83) 21                 | (84) 42                 | 97      |
| Robinson, A. E. ....    | Hectorville ....   | (85) 13                               | (86) 25                 | (87) 28                 | 66      |
| Brown, C. D. ....       | Morphettville .... | (88) 18                               | (89) 21                 | (90) 25                 | 64      |
| Riggs, N. ....          | Camden ....        | (91) 23                               | (92) 32                 | (93) 6                  | 61      |
| Anderson, J. ....       | Warradale ....     | (94) 31                               | (95) 19                 | (96) 30                 | 80      |
| Rasmussen, H. A. ....   | Ethelton ....      | (97) 32                               | (98) 29                 | (99) 39                 | 100     |
| Parker, S. J. H. ....   | Alberton ....      | (100) 38                              | (101) 33                | (102) 30                | 101     |
| Hutchinson, A. S. ....  | Athelstone ....    | (103) 37                              | (104) 33                | (105) 40                | 110     |
| Thomas, C. R. ....      | Hectorville ....   | (106) 34                              | (107) 32                | (108) 32                | 98      |
| Urwiln, A. P. ....      | Balaklava ....     | (109) 18                              | (110) 24                | (111) 32                | 74      |
| Wiese, W. ....          | Cabra ....         | (112) 33                              | (113) 37                | (114) 31                | 101     |
| Wiese, W. ....          | Cabra ....         | (115) 30                              | (116) 31                | (117) 33                | 94      |
| Williams, W. R. ....    | Frewville ....     | (118) 39                              | (119) 21                | (120) 38                | 98      |
| Williams, W. R. ....    | Frewville ....     | (121) 44                              | (122) 42                | (123) 40                | 126     |
| Marsh, C. A. ....       | Gawler ....        | (124) 34                              | (125) 36                | (126) 45                | 115     |



*Egg-Laying Competition.—Section 1.—White Leghorns—continued.*

| Competitors.        | Address.           | Score for Month ended May<br>31st, 1931. |                               |                               |         |
|---------------------|--------------------|------------------------------------------|-------------------------------|-------------------------------|---------|
|                     |                    | Bird No.<br>and Eggs<br>Laid.            | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals. |
| Cleland, W. L. .... | Beaumont.....      | (127) 41                                 | (128) 36                      | (129) 38                      | 115     |
| Cleland, W. L. .... | Beaumont .....     | (130) 42                                 | (131) 43                      | (132) 35                      | 120     |
| Sage, H. R. ....    | Nuriootpa .....    | (133) 41                                 | (134) 33                      | (135) 36                      | 110     |
| Vowels, C. C. ....  | Westbourne Park .. | (136) 34                                 | (137) 38                      | (138) 36                      | 108     |
| George, L. E. ....  | Redfern .....      | (139) 5                                  | (140) 36                      | (141) 37                      | 78      |
| Totals.....         | .....              | 1,305                                    | 1,402                         | 1,390                         | 4,097   |

*Section 2.—Black Minorcas.*

| Competitor.          | Address.        | Score for Month ended May<br>31st, 1931. |                               |                               |        |
|----------------------|-----------------|------------------------------------------|-------------------------------|-------------------------------|--------|
|                      |                 | Bird No.<br>and Eggs<br>Laid.            | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals |
| Gameau, V. F. ....   | Woodville ..... | (142) 6                                  | (143) 35                      | (144) 13                      | 54     |
| Williams, W. R. .... | Frewville ..... | (145) 6                                  | (146) 3                       | (147) 22                      | 31     |
| Earl Bros. ....      | Mallala .....   | (148) 8                                  | (149) 2                       | (150) 8                       | 18     |
| Totals.....          | .....           | 20                                       | 40                            | 43                            | 103    |

*Section 3.—Black Orpingtons.*

| Competitor.               | Address.            | Score for Month ended May<br>31st, 1931. |                               |                               |        |
|---------------------------|---------------------|------------------------------------------|-------------------------------|-------------------------------|--------|
|                           |                     | Bird No.<br>and Eggs<br>Laid.            | Bird No.<br>and Eggs<br>Laid. | Bird No.<br>and Eggs<br>Laid. | Totals |
| Southon, Mrs. E. ....     | Clarence Gardens .. | (187) 23                                 | (188) 3                       | (189) 18                      | 44     |
| Gameau, V. F. ....        | Woodville .....     | (190) 28                                 | (191) 24                      | (192) —                       | 52     |
| Williams, W. R. ....      | Frewville .....     | (193) 39                                 | (194) 43                      | (195) 53                      | 135    |
| Pillar, L. A. ....        | Hamley Bridge ..    | (196) 32                                 | (197) 42                      | (198) 35                      | 109    |
| Aird, J. R., & Son .....  | Kilkenny .....      | (199) 17                                 | (200) 44                      | (201) 2                       | 63     |
| Aird, J. R., & Son .....  | Kilkenny .....      | (202) 2                                  | (203) 6                       | (204) 2                       | 10     |
| Wade, A. E. ....          | Marion .....        | (205) 25                                 | (206) 34                      | (207) 1                       | 60     |
| Tolhurst, A. E. ....      | Torrens Park .....  | (208) 29                                 | (209) 47                      | (210) 29                      | 105    |
| Tolhurst, A. E. ....      | Torrens Park .....  | (211) 47                                 | (212) 50                      | (213) 16                      | 113    |
| Compton, R. C. ....       | Woodforde .....     | (214) 47                                 | (215) 47                      | (216) 22                      | 116    |
| Southon, Mrs. E. ....     | Clarence Gardens .. | (217) 25                                 | (218) 25                      | (219) 11                      | 61     |
| Heath, H. E. ....         | Mill End .....      | (220) 15                                 | (221) 29                      | (222) 12                      | 56     |
| Wittenbury, W. H. L. .... | Goodwood .....      | (223) 33                                 | (224) 33                      | (225) 35                      | 71     |
| Gurr, A. & H. ....        | Scott's Creek ..... | (226) 40                                 | (227) 4                       | (228) 9                       | 53     |
| Robinson, A. E. ....      | Hectorville .....   | (229) 33                                 | (230) 8                       | (231) 28                      | 69     |
| Smart, H. J. ....         | Grovene .....       | (232) —                                  | (233) 9                       | (234) 2                       | 11     |
| Williams, W. R. ....      | Frewville .....     | (235) 17                                 | (236) —                       | (237) 10                      | 27     |
| Williams, W. R. ....      | Frewville .....     | (238) 1                                  | (239) 15                      | (240) 13                      | 29     |
| Osborn, E. L. ....        | Camden .....        | (241) 24                                 | (242) 53                      | (243) 8                       | 85     |
| Totals .....              | .....               | 477                                      | 516                           | 278                           | 1,269  |



## APPLE CULTURE.

*[Notes from an address delivered by Mr. H. N. Wicks (Vice-Chairman of the Advisory Board of Agriculture) before the Ashbourne Branch of the Agricultural Bureau.]*

In the course of his remarks Mr. Wicks said the apple industry, as a wealth producer, ranked about fifth in importance, and yet it did not receive the consideration it deserved in matters of research. The steps by which the present state of the highly developed commercial apple had been achieved were outlined. He traced the development from the natural order, *Pomaceæ*, which contained several genera, one of which included the hawthorns, one the quinces, one the mountain ash, and one the pears, apples, and crabapples, the latter being the genus *Pyrus*. Within this genus were several species, nearly all of which were native to the old world, and the species from which commercial varieties had emanated was known as *Pyrus Malus*. The methods of development by seed variation through the medium of pollination were roughly outlined and the development of present-day varieties touched upon.

Apples had been in common use from earliest times when the primitive crabapple was sought after as much for the beverage, cider, obtainable from it, as for the fruit. The number of varieties now ran into thousands. Nature seemed to retrogress from the advanced types if allowed to propagate along natural lines, and for one good seedling obtained many hundreds of useless varieties were the usual result. However, occasionally a good seedling was sometimes found, e.g., Granny Smith.

In the development of new varieties by hybridization, scientific work was necessary to assist, because individuals could not usually afford experimenting in an extensive way. At the same time, each grower had to test certain practices to suit his own peculiar conditions, because identical varieties would sometimes exhibit remarkable changes in different localities. The "off-year" was giving concern to exporters, and the surmounting of this obstacle would enable a more uniform overseas supply to be sent forward, thus allowing shippers and buyers to operate with more confidence and greater satisfaction.

### LOCALITY AND SOILS.

With regard to suitable conditions for apple culture, the following applied:—Rainfall, 25-40in. A wide range of soils would grow apples successfully, but a good free loam with a good clay subsoil at about 1ft. to 15ins. was desirable, although with a good subsoil a soil of sandy, light nature would often produce a fine apple orchard. Good drainage was an essential; sourness in the soil must be avoided at all costs. The aspect of the orchard should be one facing east or north, or even to north-west not detrimental. To lay out the orchard the breaking up of the soil deeply was necessary, and it was preferable to leave the land fallow for a considerable time. Planting was best done after a good soaking rain in early winter, except in excessive rainfall districts, when spring planting was better. A wide headland, at least 30ft., should be left to provide adequate working facilities. Distance apart should be from 20ft. to 23ft., and the speaker favored square planting. An apple orchard should be a 50-year investment at least, and the preliminary work was, therefore, worth a great deal of consideration.

Pruning for the first five years should be hard, for during that time the structure of the tree was formed. Codlin moth was the worst pest, but with the help of the scientist, Mr. Wicks was hopeful that a parasite would be found to combat it, as had been done in the case of woolly aphis. When planting, care should be exercised to include varieties to cross-pollinate one another, for by this method better fruit, more of it, and less windfalls were obtained.



Mr. Wicks stated that it was possible for Australia to materially increase her apple cheque, and by attention to shipping good quality fruit and more efficient marketing methods, this was not only possible, but was the logical step to achieve, gifted as they were by favorable climatic conditions and soils suitable for the production of the finest apples, comparable with the best produced in any part of the world.

In answer to questions, Mr. Wicks said that the advent of bitter pit in Cleopatras after pruning was causing a deal of thought, and there, again, the value of research work was emphasised. The method recommended by some growers was to prune on the off-year so that a smaller quantity would be affected, and by the time the heavy crop was carried, the effects would not be so apparent. Other growers recommended merely a very light annual thinning, to keep the tree in shape.

Mr. Wicks believed that the good market in England for South Australian apples was because of the high standard of quality maintained during the past few years. He stated that the iodine test for ripeness was not always successful, and an experienced grower could tell by the appearance and the feel of the fruit when it was ready to pick and pack for export. Varieties recommended for this district were Cleopatra, Dunn's, Granny Smith, and for colored varieties Jonathan and Statesman. For a manurial dressing at planting, he favored bone manure, because the good effects were felt for several years.

## LAKE ALBERT HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR APRIL, 1931.

| Herd No.   | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                  |                       | Butterfat.                 |                        |                       | Average Test. |                            |
|------------|------------------------------|------------------------------|------------------------|-----------------------|----------------------------|------------------------|-----------------------|---------------|----------------------------|
|            |                              |                              | Per Herd during April. | Per Cow during April. | Per Cow December to April. | Per Herd during April. | Per Cow during April. |               | Per Cow December to April. |
|            |                              |                              | Lbs.                   | Lbs.                  | Lbs.                       | Lbs.                   | Lbs.                  | Lbs.          | %                          |
| 6/B . . .  | 20                           | 7.47                         | 2,145                  | 107.25                | 1,178.91                   | 92.43                  | 4.62                  | 52.29         | 4.31                       |
| 6/C . . .  | 18                           | 8.30                         | 4,950 <sup>1</sup>     | 275.03                | 1,644.89                   | 210.84                 | 11.71                 | 70.16         | 4.26                       |
| 6/F . . .  | 22.87                        | 8.90                         | 5,078 <sup>1</sup>     | 222.06                | 1,951.86                   | 239.40                 | 10.47                 | 89.31         | 4.71                       |
| 6/H . . .  | 20                           | 11.87                        | 3,803                  | 190.15                | 1,810.35                   | 184.62                 | 9.23                  | 82.46         | 4.85                       |
| 6/O . . .  | 20                           | 16.20                        | 4,095                  | 204.75                | 2,071.97                   | 235.65                 | 11.78                 | 104.03        | 5.75                       |
| 6/R . . .  | 18-20                        | 14.67                        | 8,146 <sup>1</sup>     | 447.61                | 1,172.27                   | 385.53                 | 21.18                 | 62.40         | 4.73                       |
| 6/U . . .  | 18                           | 14.53                        | 5,092 <sup>1</sup>     | 278.44                | 1,753.16                   | 262.99                 | 14.57                 | 74.34         | 5.31                       |
| 6/W . . .  | 22.43                        | 15.80                        | 7,498 <sup>1</sup>     | 334.30                | 2,312.17                   | 320.58                 | 14.29                 | 105.69        | 4.28                       |
| 6/Y . . .  | 14.87                        | 9.98                         | 4,834                  | 324.91                | 1,948.85                   | 227.29                 | 15.28                 | 85.60         | 4.75                       |
| 6/Er . . . | 51.60                        | 44.60                        | 22,866 <sup>1</sup>    | 443.15                | 2,392.94                   | 989.35                 | 19.17                 | 101.14        | 4.33                       |
| 6/I . . .  | 34.03                        | 27.07                        | 15,973                 | 469.38                | 2,943.69                   | 720.55                 | 21.17                 | 129.63        | 4.61                       |
| 6/KK . . . | 26.07                        | 22.37                        | 11,455 <sup>1</sup>    | 439.41                | 2,801.77                   | 545.81                 | 20.94                 | 125.36        | 4.76                       |
| 6/LL . . . | 24                           | 22.97                        | 18,253                 | 552.21                | 3,075.18                   | 547.62                 | 22.82                 | 132.79        | 4.13                       |
| C/MM . . . | 14                           | 7.90                         | 4,502                  | 321.57                | 1,769.26                   | 219.04                 | 15.65                 | 84.81         | 4.87                       |
| 6/OO . . . | 20                           | 16.19                        | 12,770                 | 638.50                | 3,213.87                   | 586.99                 | 29.35                 | 144.42        | 4.60                       |
| 6/PP . . . | 20                           | 19.43                        | 11,737                 | 586.85                | 3,198.86                   | 564.10                 | 28.21                 | 152.68        | 4.81                       |
| 6/QQ . . . | 28.97                        | 27.77                        | 21,312 <sup>1</sup>    | 735.67                | 3,680.07                   | 941.46                 | 32.50                 | 160.55        | 4.42                       |
| 6/Rr . . . | 33                           | 26.47                        | 20,581 <sup>1</sup>    | 623.68                | 3,453.82                   | 934.44                 | 28.32                 | 152.40        | 4.54                       |
| 6/Ss . . . | 25.33                        | 24                           | 18,712                 | 738.73                | 4,284.35                   | 764.92                 | 29.80                 | 171.87        | 4.03                       |
| 6/Tt . . . | 24                           | 21.27                        | 11,545                 | 481.04                | 2,483.69                   | 561.56                 | 23.40                 | 115.64        | 4.86                       |
| 6/Uu . . . | 40                           | 33.80                        | 14,865 <sup>1</sup>    | 371.64                | 2,364.99                   | 654.72                 | 16.37                 | 103.05        | 4.40                       |
| 6/Vv . . . | 20                           | 18.57                        | 11,955 <sup>1</sup>    | 597.78                | 2,746.89                   | 544.90                 | 27.25                 | 128.79        | 4.56                       |
| Means .    | 24.34                        | 19.09                        | 10,777.84              | 442.90                | 2,555.70                   | 487.49                 | 20.03                 | 113.69        | 4.52                       |



## NARRUNG HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR APRIL, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                  |                       |                           | Butterfat.             |                       |                           | Average Test. |
|----------|------------------------------|------------------------------|------------------------|-----------------------|---------------------------|------------------------|-----------------------|---------------------------|---------------|
|          |                              |                              | Per Herd during April. | Per Cow during April. | Per Cow October to April. | Per Herd during April. | Per Cow during April. | Per Cow October to April. |               |
|          |                              |                              | Lbs.                   | Lbs.                  | Lbs.                      | Lbs.                   | Lbs.                  | Lbs.                      | %             |
| 5/C....  | 28-50                        | 15-87                        | 7,423½                 | 280-47                | 3,188-85                  | 408-41                 | 14-33                 | 157-83                    | 5-50          |
| 5/D....  | 30                           | 14-47                        | 5,892                  | 196-42                | 2,832-79                  | 348-80                 | 11-63                 | 152-29                    | 5-93          |
| 5/E....  | 35                           | 25-27                        | 10,509½                | 300-27                | 3,032-05                  | 552-91                 | 15-80                 | 156-21                    | 5-26          |
| 5/J....  | 23                           | 14-90                        | 6,812½                 | 296-19                | 2,341-54                  | 341-60                 | 14-85                 | 125-15                    | 5-01          |
| 5/O....  | 22-37                        | 37-07                        | 9,652½                 | 230-43                | 3,533-11                  | 295-97                 | 13-27                 | 189-56                    | 5-73          |
| 5/S....  | 54                           | 16-73                        | 10,105                 | 178-75                | 2,324-35                  | 413-24                 | 7-65                  | 98-88                     | 4-28          |
| 5/R....  | 30                           | 16-73                        | 10,105                 | 334-83                | 2,611-07                  | 485-75                 | 16-19                 | 129-88                    | 4-81          |
| 5/T....  | 20                           | 14                           | 8,226                  | 411-30                | 3,590-39                  | 413-50                 | 20-68                 | 164-33                    | 5-03          |
| 5/U....  | 21                           | 15-20                        | 12,068½                | 574-69                | 4,480-68                  | 602-37                 | 28-68                 | 197-49                    | 4-99          |
| 5/V....  | 26-30                        | 22-17                        | 11,408½                | 433-78                | 4,148-78                  | 691-51                 | 26-29                 | 221-40                    | 6-06          |
| 5/W....  | 27-87                        | 14-63                        | 14,955½                | 586-62                | 4,490-67                  | 709-50                 | 25-46                 | 214-71                    | 4-74          |
| 5/X....  | 18                           | 17-47                        | 7,403                  | 411-28                | 3,118-83                  | 436-13                 | 24-23                 | 161-83                    | 5-89          |
| 5/Y....  | 20-13                        | 15-53                        | 8,297½                 | 284-84                | 2,113-94                  | 358-78                 | 12-32                 | 93-00                     | 4-32          |
| 5/AA.... | 21                           | 19-10                        | 8,297                  | 395-09                | 3,396-00                  | 493-69                 | 23-51                 | 179-50                    | 5-95          |
| 5/AB.... | 14                           | 11-73                        | 4,389                  | 313-50                | 4,034-51                  | 246-69                 | 17-02                 | 197-58                    | 5-02          |
| 5/AC.... | 28-53                        | 15-87                        | 8,700                  | 304-94                | 3,932-82                  | 437-89                 | 15-35                 | 186-60                    | 5-03          |
| 5/AD.... | 32-63                        | 27-43                        | 15,938                 | 488-44                | 3,700-42                  | 721-66                 | 22-12                 | 169-20                    | 4-53          |
| 5/AE.... | 22                           | 17-90                        | 12,237                 | 556-23                | 3,648-71                  | 548-74                 | 24-94                 | 165-82                    | 4-48          |
| 5/AF.... | 13-03                        | 12-63                        | 6,630                  | 486-42                | 3,950-92                  | 350-87                 | 25-74                 | 206-44                    | 5-29          |
| 5/AG.... | 29                           | 25-73                        | 11,492                 | 396-27                | 3,741-55                  | 561-18                 | 19-35                 | 167-92                    | 4-88          |
| 5/AH.... | 21                           | 19-13                        | 9,014½                 | 429-26                | 3,751-52                  | 431-51                 | 20-55                 | 172-45                    | 4-79          |
| Means    | 26-05                        | 18-43                        | 9,266-31               | 355-77                | 3,322-29                  | 469-08                 | 18-01                 | 161-00                    | 5-06          |

## THE HILLS HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR APRIL, 1931.

| Herd No.  | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                  |                       |                        | Butterfat.             |                       |                        | Average Test. |
|-----------|------------------------------|------------------------------|------------------------|-----------------------|------------------------|------------------------|-----------------------|------------------------|---------------|
|           |                              |                              | Per Herd during April. | Per Cow during April. | Per Cow July to April. | Per Herd during April. | Per Cow during April. | Per Cow July to April. |               |
|           |                              |                              | Lbs.                   | Lbs.                  | Lbs.                   | Lbs.                   | Lbs.                  | Lbs.                   | %             |
| 7/D....   | 23-20                        | 20-30                        | 11,900½                | 512-95                | 6,244-95               | 480-22                 | 20-96                 | 261-90                 | 4-09          |
| 7/E....   | 26-90                        | 23-90                        | 10,044                 | 378-38                | 6,407-46               | 425-51                 | 15-82                 | 207-37                 | 4-24          |
| 7/H....   | 8                            | 6-23                         | 3,806½                 | 475-81                | 6,512-91               | 181-80                 | 22-73                 | 310-52                 | 4-78          |
| 7/J....   | 19                           | 17-80                        | 11,439                 | 602-05                | 6,022-98               | 519-12                 | 27-32                 | 281-48                 | 4-54          |
| 7/K....   | 18                           | 16-20                        | 9,578                  | 530-63                | 7,155-33               | 399-88                 | 22-16                 | 307-76                 | 4-19          |
| 7/L....   | 34-83                        | 32-97                        | 11,356                 | 326-04                | 4,794-87               | 562-82                 | 16-73                 | 228-56                 | 5-13          |
| 7/O....   | 19-77                        | 19                           | 5,537                  | 280-06                | 4,278-38               | 282-24                 | 14-27                 | 205-45                 | 5-10          |
| 7/S....   | 17                           | 8-37                         | 6,351                  | 373-59                | 5,341-05               | 332-27                 | 19-55                 | 288-21                 | 5-23          |
| 7/V....   | 11                           | 10                           | 5,445                  | 495-00                | 4,558-00               | 264-76                 | 24-07                 | 219-18                 | 4-86          |
| 7/T....   | 10-93                        | 9-93                         | 4,225                  | 386-54                | 5,206-18               | 181-22                 | 16-58                 | 219-35                 | 4-29          |
| 7/W....   | 21                           | 17-47                        | 11,029                 | 525-19                | 6,312-91               | 489-10                 | 23-29                 | 284-84                 | 4-43          |
| 7/X....   | 15                           | 11-87                        | 5,301                  | 353-40                | 6,194-83               | 240-91                 | 16-06                 | 264-29                 | 4-54          |
| 7/Y....   | 21-20                        | 20-20                        | 10,254                 | 483-87                | 4,781-45               | 487-93                 | 23-02                 | 227-43                 | 4-76          |
| 7/Z....   | 12-57                        | 10-57                        | 9,255                  | 736-27                | 4,957-20               | 384-29                 | 30-57                 | 218-66                 | 4-15          |
| 7/AA....  | 8                            | 7                            | 3,270                  | 408-75                | 4,590-25               | 168-43                 | 21-05                 | 231-85                 | 5-15          |
| 7/BB....  | 15                           | 13                           | 6,990                  | 464-00                | 5,888-77               | 304-50                 | 20-80                 | 247-57                 | 4-87          |
| 7/DD....  | 11                           | 9                            | 4,920                  | 447-27                | 5,962-40               | 249-26                 | 22-66                 | 296-38                 | 5-07          |
| 7/EE....  | 23-70                        | 15-10                        | 4,510½                 | 190-32                | 3,902-59               | 195-91                 | 8-27                  | 162-59                 | 4-34          |
| 7/GG....  | 14                           | 13-27                        | 3,841                  | 274-86                | 4,467-88               | 225-82                 | 16-09                 | 231-84                 | 5-87          |
| 7/HH....  | 15-47                        | 13-87                        | 6,386½                 | 409-59                | 4,957-87               | 294-81                 | 19-02                 | 218-60                 | 4-64          |
| *7/II.... | 13-77                        | 12-90                        | 8,058½                 | 585-22                | 4,801-21               | 374-10                 | 27-17                 | 228-72                 | 4-64          |
| †7/JJ.... | 19                           | 19                           | 9,225                  | 485-53                | 2,440-34               | 405-82                 | 21-36                 | 107-67                 | 4-40          |
| Means     | 17-20                        | 14-91                        | 7,392-89               | 429-88                | 5,506-31               | 339-84                 | 19-76                 | 249-39                 | 4-60          |

\* Commenced August.

† Commenced January.



# Scientific Farming!

**THAT** is the only proper response to present troubles—**THAT** is the road to solvency and restored prosperity. . .

Economies are necessary, but to cut the application of super in this years farming effort would be a fatal mistake. .

Science and Economy dictate the liberal use of

## W.M.L. EXTRA HIGH-GRADE SUPER

for it lowers costs by increasing yields.





## STATE OF SOUTH AUSTRALIA.

## FINAL RESULTS OF CEREAL AND HAY HARVEST, 1930-31.

[By W. L. JOHNSTON, Government Statist.]

Wheat, 34,871,526 (23,345,093 bush.); average, 8.34 (6.40) per acre.

1. *Acreage Cropped*.—The acreage sown for all purposes with Wheat, Barley, and Oats aggregated 5,293,882 (4,827,861) acres; increase, 466,019 acres. Distributed as follows:—For Grain—Wheat, 4,180,513 (3,645,764) acres; increase, 534,749 acres. Barley, 251,957 (305,316) acres; decrease, 53,359 acres. Oats, 218,416 (277,923) acres; decrease, 59,507 acres. Hay (Wheat, Barley, and Oats), 601,240 (534,886) acres; increase, 66,354 acres.

2. *Failures*.—Owing to adverse seasonal conditions considerable areas completely failed. Out of 5,293,882 acres sown, 375,000 acres are estimated to have failed for the purpose for which sown. Of this area only 42,000 acres were profitably fed off, the balance of 333,000 acres being a complete failure.

3. *Production*.—Wheat—34,871,526 (23,345,093) bushels; increase, 11,526,433 bushels; average per acre, 8.34 (6.40) bushels. Barley—3,960,929 (4,656,254) bushels; average, 15.72 (15.25) bushels. Oats—2,080,311 (1,564,287) bushels; average, 9.52 (5.63) bushels. Hay—621,171 (431,044) tons.

4. *Benefits of Fallow*.—Of the total wheat crop, 23,718,522 (18,904,280) bushels were produced from fallow land, and averaged 11.05 (9.07) bushels per acre; whilst the remainder, 11,153,004 (4,480,813) bushels, was from land not fallowed, and only averaged 5.48 (2.84) bushels per acre, resulting in an aggregate average of 8.34 (6.40) bushels per acre.

5. *Exportable Surplus*.—After making the usual allowances for Seed Wheat and home consumption, it is estimated that 28,000,000 bushels of Wheat are available for export. Of this quantity over 14,000,000 bushels have been exported. The mean value of over-sea exports of Wheat and Flour for the five years ended 1929-1930 was £5,540,076 and of Barley £201,920. For the 10 months of the year 1930-1931 the export values are:—Wheat and Flour, £2,205,642; Barley, £288,463.

1. *Acreage Cropped*.  
(Failures included.)

| Divisions.           | Total<br>Wheat,<br>Barley,<br>Oats. | Grain.    |         |         | Hay.<br>(W.B.O.) | Fed off<br>Areas.<br>(W.B.O.) |
|----------------------|-------------------------------------|-----------|---------|---------|------------------|-------------------------------|
|                      |                                     | Wheat.    | Barley. | Oats.   |                  |                               |
|                      | Acres.                              | Acres.    | Acres.  | Acres.  | Acres.           | Acres.                        |
| Central .....        | 1,008,645                           | 582,878   | 176,154 | 31,551  | 208,995          | 9,067                         |
| Lower North ....     | 1,037,136                           | 847,864   | 39,117  | 20,517  | 119,979          | 9,659                         |
| Upper North ....     | 361,263                             | 334,872   | 840     | 1,882   | 22,230           | 1,439                         |
| South-Eastern ...    | 134,948                             | 70,201    | 14,623  | 19,869  | 27,048           | 3,187                         |
| Western .....        | 1,404,052                           | 1,238,448 | 10,282  | 79,767  | 70,124           | 5,431                         |
| Murray Mallee ...    | 1,347,838                           | 1,106,250 | 10,941  | 64,810  | 152,864          | 12,973                        |
| Total, 1930-31       | 5,293,882                           | 4,180,513 | 251,957 | 218,416 | 601,240          | 41,756                        |
| Total, 1929-30       | 4,827,863                           | 3,645,764 | 305,316 | 277,923 | 534,886          | 63,974                        |
| Increase of decrease | 466,019                             | 534,749   | —53,359 | —59,507 | 66,354           | —22,218                       |



## 2. Production of Grain and Hay.

| Divisions.           | Grain.     |       |           |       |           |       | Hay.<br>(W.B.O.) |
|----------------------|------------|-------|-----------|-------|-----------|-------|------------------|
|                      | Wheat.     |       | Barley.   |       | Oats.     |       |                  |
|                      | Bush.      | Av.   | Bush.     | Av.   | Bush.     | Av.   | Tons.            |
| Central .....        | 7,366,918  | 12.64 | 2,860,018 | 16.24 | 413,793   | 13.12 | 262,802          |
| Lower North ...      | 9,558,825  | 11.27 | 548,542   | 14.02 | 238,919   | 11.64 | 122,635          |
| Upper North ...      | 1,720,530  | 5.14  | 7,035     | 8.38  | 12,963    | 6.89  | 17,607           |
| South-Eastern ..     | 1,042,883  | 14.86 | 326,254   | 22.31 | 415,932   | 20.91 | 35,274           |
| Western .....        | 5,537,050  | 4.47  | 106,352   | 10.34 | 382,577   | 4.80  | 44,063           |
| Murray Mallee ..     | 9,645,320  | 8.72  | 112,728   | 10.30 | 616,127   | 9.51  | 138,990          |
| Total, 1930-31.      | 34,871,526 | 8.34  | 3,960,929 | 15.72 | 2,080,311 | 9.52  | 621,171          |
| Total, 1929-30.      | 23,345,093 | 6.40  | 4,656,254 | 15.25 | 1,564,287 | 5.63  | 431,044          |
| Increase or decrease | 11,526,433 | 1.94  | -695,325  | 0.47  | 516,024   | 3.89  | 190,127          |

## 3. Five Years' Comparison.

| Year.         | Wheat.    |            |                 | Value of Oversea Exports. |                     |
|---------------|-----------|------------|-----------------|---------------------------|---------------------|
|               | Area.     | Yield.     | Aver. per Acre. | Wheat and Flour.          | Barley.             |
|               | Acres.    | Bush.      | Bush.           | £                         | £                   |
| 1925-26 ..... | 2,465,648 | 28,603,101 | 11.60           | 7,412,467                 | 137,288             |
| 1926-27 ..... | 2,768,403 | 35,558,711 | 12.84           | 7,094,456                 | 351,446             |
| 1927-28 ..... | 2,941,360 | 24,066,012 | 8.18            | 5,415,401                 | 232,108             |
| 1928-29 ..... | 3,445,563 | 26,826,094 | 7.79            | 3,911,088                 | 211,099             |
| 1929-30 ..... | 3,645,764 | 23,345,093 | 6.40            | 3,866,967                 | 77,660              |
| Mean .....    | 3,053,348 | 27,679,802 | 9.07            | 5,540,076                 | 201,920             |
| 1930-31 ..... | 4,180,513 | 34,871,526 | 8.34            | 2,205,642<br>10 months    | 288,463<br>10 mths. |

**MEGGITT'S LINSEED MEAL.**

The seasonal reduction during certain months of the year in the output of milk, cream, butter, and cheese, can definitely be checked by the use of Meggitt's Linseed Meal.

Meggitt's is a highly concentrated food, rich in essential milk producing and body building protein, and conditioning linseed oil in the correct proportions.

Sold in any quantity, from one bag (100lbs.) upwards.

Obtainable from any Dairy Produce Factory, Grain or Chaff Merchant, or direct from—

**ELDER, SMITH, & CO., LIMITED,**

SELLING AGENTS IN SOUTH AUSTRALIA.



## ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR JUNE.

[By CHAS. H. BEAUMONT, District Horticultural Instructor.]

Planting should be completed as soon as possible. It is much easier to handle the young trees if stakes are placed in the exact position to start with; then put the young tree against the stake and proceed with the filling in. Do not go on with the planting in the rain or if the filling is wet and sodden. The young trees may be pruned before planting, but it is preferable to do it later on. If details are required, consult the Instructor for your district.

Get ahead with the pruning; clear up all broken or dead limbs first, and then make the pruning as light as possible. A minute or two will remove a big limb, but it will take years to replace it.

Clean up trees and remove any shelter for codlin moth larvae; hollows in old trees may be filled with concrete after removing decayed matter. On wet days hunt out codlin larvae in sheds and boxes; everyone killed will lessen the damage in the summer.

Rough up the soil, especially about the trees, so as to get full benefit of all the rain which falls, but arrange for disposal of excess water and prevent washaways.

Citrus trees need watching for "brown rot"; keep limbs up from the ground and spray with Bordeaux mixture on the first sign of trouble. Keep aphids down.

Clean up celery beds; burn, or bury refuse deeply.

Dig strawberry beds and finish planting; do not allow water to lie about the plants.

Olives will be ready for gathering; do not allow them to waste as usual, but get someone to take the crop if you do not value it.

Tomato houses will be got ready for planting. Use only seed from known healthy plants and start them in sterilised seed beds; on no account plant out weak-looking seedlings.

Apples in cold store require watching and sorting out. Generally, they are not keeping very well this year.

### *A Few Observations on Codlin Moth.*

The small crop of apples this season suffered severely from the moth despite the continual use of arsenate of lead spray. Some growers blamed the quality of the material. I was shown fruits thickly coated with arsenate of lead, and successful entrances had been made by the caterpillar through thick accumulations of the spray. This would tend to bear out the contention of the orchardist that the spray was not effective. The only explanation was that the caterpillar was averse to eating through the spray material and had cleaned a place to start before perforating the skin of the fruit. One apple exhibited to me had twenty entrances.

Other growers were inclined to blame their neighbors for being negligent, but examination did not bear this out. One contended that it was impossible to do good work except by using a power pump at high pressure, 250lb. to 300lb. per square inch. I consider that this contention is wrong, as a good hand pump should do equally good work, though not so speedily or cheaply as the power pump. The use of white oils was variously commented on, some saying that the oil was useless and damaged the fruit. Others said that for the amount of good it did it was too costly and so was not worth using, whilst others were quite satisfied that the use of the oil was a distinct benefit. Experiments thus far conducted with oils at the State Orchard were not wholly favorable. The orchard with the least affected fruit was dusted, and dusted well.

Operations as at present conducted were not what we needed, and something more was required to successfully check the work of the moth, and new methods or additional methods must not increase the costs, which were already almost prohibitive.



The most hopeful proposition was the introduction of the parasite *Trichogramma minutum* (*Tricky*). Eight years ago this wasp was operating in California, and a considerable quantity of writing had been done about this little helper, recent reports being distinctly encouraging. Another method worthy of testing would be the use of some material as a spray or dust or smoke which would have a repellent effect on the moth and drive it away from the trees. Natural parasites are perhaps available here. I had been asked to arrange to destroy some "rotten" old trees on a deserted property in the scrub, about two miles away from the orchardist who complained about them. On examination of the trees, which carried a medium crop of low-quality fruit, I could not find any codlin-infested fruit. This was not an isolated experience. At the present season all that was left for us to do was to intensify the work of destroying the larvae of the moth by clearing away all harbors like loose bark or decaying parts of the tree. Windfalls should not be allowed to remain about the orchard, and boxes and storerooms should be thoroughly cleaned up. I am convinced that second-hand boxes were the main source of infection. The various brands of arsenate of lead were well made and true to label.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on May 27th, there being present Messrs. F. Coleman (Chairman), H. N. Wicks (Vice-Chairman), A. M. Dawkins, A. L. McEwin, P. H. Jones, S. Shepherd, P. J. Baily, Professor A. J. Perkins (Director of Agriculture), Dr. A. E. V. Richardson (Director Waite Research Institute), Mr. W. B. Birks (Principal Agricultural College, Roseworthy), and H. C. Pritchard (Secretary). Apologies were received from Messrs. G. Jeffrey and H. S. Taylor.

*1931 Annual Congress.*—The Secretary intimated that approval had been obtained to hold the Forty-second Annual Congress of the Agricultural Bureau during Show week, and that His Excellency the Governor had consented to deliver the opening address.

*Formation of Branch of Bureau at Belvidere.*—An application was received from residents of Belvidere asking approval for the formation of a Branch of the Agricultural Bureau in that district. Because of the close proximity of the proposed Branch to a Branch already actively working, the Board withheld its decision pending a report from the General Secretary, who was instructed to convene and attend a meeting of each of the Branches concerned and report to the Board.

*Life Members.*—The names of Messrs. W. L. Brown, A. Spriggs, F. W. Jericho, G. A. Dreckow, and R. B. Deer, of the Yandarie Branch, were added to the roll of life members of the Agricultural Bureau.

*Leave of Absence.*—The Secretary was instructed to make application to the Minister of Agriculture for leave of absence on behalf of Mr. G. Jeffrey owing to illness.

*Letter of Sympathy.*—Members learned with regret of the continued illness of Mr. H. S. Taylor, and it was decided to send a letter of sympathy to Mr. Taylor and expressing the hope that he would soon be restored to good health.

*New Members.*—The following names were added to the rolls of existing Branches:—Warrambo—H. F. Chilman; Blackwood—G. Armstrong, W. J. Hargreaves; Longwood—C. Palmer; Greenock—A. F. Giles; Brinkley—E. L. White; Currency Creek—L. C. Collett, R. L. Stephens; Kangarilla Women's—Mrs. A. Strickland; Upper Wakefield—Harry Welke, Gus Welke, Ewald Welke, Alfred Welke; Pygery—J. F. Heylen; Mangalo—F. Coles; Riverton—J. F. Smith, G. B. Payne; Scott's Bottom—P. C. Mitchell, O. H. Ringvall; Taragoro—Vernon Guy; Renmark—J. W. Duggin.

Number of members, 8,507; number of Branches, 305.

*In Committee.*—Several other items in the agenda were taken in Committee.



## DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on June 1st:—

**BUTTER.**—The farming community generally are giving more attention now to dairying and the side lines of the farm owing to the prices for cereals having fallen to such an extent. The result is that increasing quantities of cream and butter are coming forward each week, and this State has already a surplus for export, which is going forward by the *Jervis Bay* this week. Such early shipments are almost unprecedented, and the propitious weather conditions which have continued throughout the season should result in record quantities being exported overseas from South Australia. A feature in the increased production, however, is the large quantities of store and collectors' butters being marketed, and the reason for this is because no levy has to be paid by makers on same, whereas factory butter is subject to a levy. As milled butter cannot be exported, except at very low prices, values for store and collectors' butters are now considerably easier in price, although factory butters remain steady. Choicest creamery fresh butter, in bulk, 1s. 4½d.; prints and delivery extra; second and third grades, 1s. 2½d. (these prices are subject to the stabilisation levies); well-conditioned store and collectors, 9d. to 10d.

**EGGS.**—Production as usual at this time of the year declined rapidly, but now is showing a slight increase. Supplies are more than sufficient for local needs, and small quantities are going forward to Melbourne and Sydney each week. Rates are steady. Ordinary country eggs, fresh hen 1s. per dozen; duck, 1s. 1d. per dozen; selected, tested, and infertile higher.

**CHEESE.**—The consignments from the factories during the past few weeks have been small, and it will be several weeks yet before any marked increase in supplies is possible, as in the south-eastern parts of the State the cooler weather retards the growth of the pastures. Values are firm in consequence of the shorter supplies. New makes, large to loaf, 7½d. to 8½d. per lb.; semi-matured and matured, 10d. to 11d. per lb.

**ALMONDS.**—Good supplies continued throughout the month, and values hardened. This, however, did not in any way cause demand to slacken, and ready clearances were made of consignments from week to week. Kernels also are selling freely both to local and interstate buyers. Brandis, 7d. to 7½d.; mixed softshells, 6d. to 6½d.; hardshells, 3½d. to 3¾d.; kernels, 1s. 7d. to 1s. 7½d. per lb.

**HONEY.**—Moderate demand was experienced for honey throughout May. Unfortunately, owing to regulations regarding "foul brood," a number of sales which could have been made to Western Australia were prevented, so that stocks are now heavier than they otherwise would have been. Values are steady. Prime clear extracted, in liquid condition, 3½d. to 3¾d.; best quality candied lots, 2¾d. to 3½d.; second grade, 1½d. to 2d. per lb.

**BEEWAX.**—Moderate supplies; demand steady. 1s. 2d. to 1s. 2½d. per lb.

**BACON.**—The consumption of bacon was well maintained, and sales of all cuts of prime quality were effected. The factories kept the market well supplied from week to week, and values continued steady. Best local sides, 9d. to 9½d.; best local factory-cured middles, 9d. to 9½d.; large, 8½d.; local rolls, 7d. to 7½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 1d.; local hams, 11d. to 1s.; cooked, 1s. 2d.; "Sugar Cane" brand lard, in packets, 11d.; in bulk, 10d. per lb.; local prints, 9d. per lb.

**LIVE POULTRY.**—The demand for live poultry throughout the month under review kept up better than might have been expected. As prices ruling at present are lower than they have been for some years, consumers are apparently paying more attention to poultry as against other meats, with the result that the demand is improving. The quality and condition of turkeys was, generally speaking, only poor to medium, but are now showing improvement with the growth of grass. The sales which are held every Tuesday, Thursday, and Friday are always attended by a large number of buyers. We advise consigning. Crates loaned on application. Prime roosters, 3s. 3s. to 4s. 6d.; nice-conditioned cockerels, 2s. 6d. to 3s.; fair-conditioned cockerels, 2s. to 2s. 5d.; chickens lower. Heavy-weight hens, 3s. 3d. to 4s.; medium hens, 2s. 4d. to 3s.; light hens, 1s. 8d. to 2s. 3d.; couple of pens of weedy sorts lower. Geese, 3s. 6d. to 5s.; prime young Muscovy drakes, 3s. to 4s. 6d.; Muscovy ducks, 2s. 3d. to 2s. 9d.; ordinary ducks, 1s. 8d. to 2s. 1d.; ducklings lower. Turkeys, good to prime condition, 7½d. to 9d. per lb. live weight; do., fair condition, 6d. to 7d. per lb. live weight; do., fatening sorts lower. Pigeons, 3½d. to 5d. each.

**POTATOES.**—Local, 5s. per cwt.

**ONIONS.**—Brown, 5s. per cwt.



# IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., APRIL, 1931.

## IMPORTS.

### Interstate.

|                                         |       |
|-----------------------------------------|-------|
| Apples (bushels) .. . . .               | 1,822 |
| Bananas (bushels) .. . . .              | 8,997 |
| Citrus—                                 |       |
| Grape fruit (bushel) .. . . .           | 1     |
| Lemons (bushels) .. . . .               | 7     |
| Oranges (bushels) .. . . .              | 2     |
| Passion fruit (bushels) .. . . .        | 320   |
| Paw paws (bushels) .. . . .             | 3     |
| Pineapples (bushels) .. . . .           | 458   |
| Tomatoes (bushels) .. . . .             | 59    |
| Peanuts (bags) .. . . .                 | 6     |
| Peanuts, kernels (bags) .. . . .        | 13    |
| Cabbages (bags) .. . . .                | 7     |
| Onions (bags) .. . . .                  | 1,459 |
| Peas (bags) .. . . .                    | 3     |
| Potatoes (bags) .. . . .                | 486   |
| Swedes (bag) .. . . .                   | 1     |
| Bulbs (packages) .. . . .               | 62    |
| Plants (packages) .. . . .              | 140   |
| Seeds (packages) .. . . .               | 116   |
| Wine casks (number) .. . . .            | 1,791 |
| Fumigated--Wine casks (number) .. . . . | 16    |
| Rejected—                               |       |
| Bananas (bushels) .. . . .              | 35    |
| Pineapples (bushels) .. . . .           | 33    |
| Second-hand bags .. . . .               | 10    |

### Overseas.

#### (State Law.)

|                              |       |
|------------------------------|-------|
| Wine casks (number) .. . . . | 1,142 |
|------------------------------|-------|

#### Federal Quarantine Act.

|                     | Packages. | Lbs.      |
|---------------------|-----------|-----------|
| Seeds, &c. .. . . . | 1,806     | 302,624   |
|                     |           | Sup. ft.  |
| Timber .. . . .     | 88,972    | 3,179,077 |

## EXPORTS.

### Federal Commerce Act.

|                             | Packages. |
|-----------------------------|-----------|
| England—Apples .. . . .     | 5,901     |
| Grapes .. . . .             | 50        |
| Pears .. . . .              | 1,329     |
| Germany—Apples .. . . .     | 316       |
| India—Grapes .. . . .       | 1,540     |
| Apples .. . . .             | 1,856     |
| New Zealand—Grapes .. . . . | 282       |
| Seeds .. . . .              | 21        |



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month and to the end of May, 1931, also the average precipitation to the end of May and the average annual rainfall.

| Station.                          | For May, 1931. | To end May. | Av'ge to end May. | Av'ge Annual Rain-fall. | Station.                      | For May, 1931. | To end May. | Av'ge to end May. | Av'ge Annual Rain-fall. |
|-----------------------------------|----------------|-------------|-------------------|-------------------------|-------------------------------|----------------|-------------|-------------------|-------------------------|
| <b>FAR NORTH AND UPPER NORTH.</b> |                |             |                   |                         | <b>LOWER NORTH—continued.</b> |                |             |                   |                         |
| Oodnadatta .....                  | 0·80           | 0·98        | 2·17              | 4·72                    | Brinkworth ....               | 2·62           | 5·48        | 4·64              | 15·85                   |
| Marree .....                      | 0·37           | 2·74        | 2·41              | 5·86                    | Blyth .....                   | 2·50           | 5·95        | 5·42              | 16·86                   |
| Farina .....                      | 0·42           | 4·02        | 2·79              | 6·46                    | Clare .....                   | 3·00           | 7·76        | 7·57              | 24·61                   |
| Copley .....                      | 0·82           | 4·19        | 3·36              | 7·93                    | Mintaro .....                 | 3·89           | 8·10        | 6·50              | 23·43                   |
| Beltana .....                     | 0·48           | 3·42        | 3·55              | 8·59                    | Watervale .....               | 3·12           | 8·05        | 8·16              | 27·10                   |
| Blinman .....                     | 0·91           | 4·14        | 5·66              | 12·02                   | Auburn .....                  | 3·50           | 7·44        | 7·51              | 24·08                   |
| Hookina .....                     | 1·01           | 5·73        | 3·76              | 11·51                   | Hoyleton .....                | 2·10           | 4·93        | 5·55              | 17·44                   |
| Hawker .....                      | 1·35           | 8·45        | 3·98              | 12·28                   | Balaklava .....               | 1·71           | 3·83        | 5·23              | 15·61                   |
| Wilson .....                      | 1·05           | 6·57        | 3·86              | 11·84                   | Port Wakefield .              | 1·06           | 3·29        | 4·85              | 13·04                   |
| Gordon .....                      | 0·78           | 4·94        | 3·69              | 10·73                   | Terowie .....                 | 1·25           | 3·55        | 4·30              | 13·47                   |
| Quorn .....                       | 1·28           | 4·67        | 4·23              | 13·42                   | Yarcoowie .....               | 1·36           | 3·28        | 4·49              | 13·72                   |
| Port Augusta .....                | 0·54           | 4·29        | 3·61              | 9·43                    | Hallett .....                 | 1·62           | 4·02        | 4·88              | 16·47                   |
| Bruce .....                       | 1·45           | 4·69        | 3·15              | 9·94                    | Mount Bryan ..                | 2·12           | 4·11        | 4·78              | 16·79                   |
| Hammond .....                     | 1·13           | 4·28        | 3·83              | 11·41                   | Koorunga .....                | 1·94           | 4·69        | 5·55              | 17·96                   |
| Wilmington .....                  | 1·36           | 5·11        | 5·58              | 17·63                   | Farrell's Flat ..             | 2·69           | 5·92        | 5·67              | 18·75                   |
| Willowie .....                    | 1·25           | 4·60        | 3·88              | 12·11                   | <b>WEST OF MURRAY RANGE.</b>  |                |             |                   |                         |
| Melrose .....                     | 2·65           | 6·20        | 7·27              | 23·01                   | Manoora .....                 | 3·17           | 6·23        | 5·55              | 18·94                   |
| Booleroo Centre ..                | 2·06           | 4·78        | 4·78              | 15·26                   | Saddleworth ...               | 2·70           | 5·89        | 6·27              | 19·60                   |
| Port Germein .....                | 1·48           | 3·95        | 4·45              | 12·47                   | Marrabel .....                | 3·30           | 6·51        | 5·97              | 19·87                   |
| Wirrabara .....                   | 2·11           | 4·09        | 5·83              | 19·34                   | Riverton .....                | 3·28           | 6·94        | 6·51              | 20·81                   |
| Appila .....                      | 1·20           | 3·07        | 4·86              | 14·69                   | Tarlee .....                  | 2·79           | 5·78        | 5·76              | 18·13                   |
| Craddock .....                    | 0·83           | 5·09        | 3·67              | 10·87                   | Stockport .....               | 2·78           | 5·86        | 5·22              | 16·81                   |
| Carrieton .....                   | 1·58           | 4·56        | 4·00              | 12·40                   | Hamley Bridge .               | 2·17           | 4·57        | 5·30              | 16·60                   |
| Johnburg .....                    | 1·21           | 4·02        | 3·48              | 10·64                   | Kapunda .....                 | 3·57           | 6·32        | 6·34              | 19·85                   |
| Eurelia .....                     | 1·49           | 4·35        | 4·25              | 13·06                   | Freeling .....                | 3·28           | 5·89        | 5·51              | 17·95                   |
| Orroroo .....                     | 1·70           | 4·29        | 4·53              | 13·28                   | Greenock .....                | 3·08           | 6·09        | 6·45              | 21·68                   |
| Nackara .....                     | 0·71           | 3·38        | 4·20              | 11·16                   | Truro .....                   | 2·52           | 5·34        | 6·02              | 20·09                   |
| Black Rook .....                  | 1·26           | 3·75        | 4·21              | 12·50                   | Stockwell .....               | 2·92           | 5·53        | 6·02              | 20·18                   |
| Oodlavrira .....                  | 1·32           | 4·30        | —                 | —                       | Nuriootpa .....               | 3·36           | 6·96        | 6·10              | 20·65                   |
| Peterborough .....                | 1·51           | 4·06        | 4·43              | 13·30                   | Angaston .....                | 3·27           | 6·82        | 6·65              | 22·49                   |
| Yongala .....                     | 1·70           | 4·48        | 4·48              | 14·46                   | Tanunda .....                 | 2·68           | 5·36        | 6·74              | 22·12                   |
| <b>NORTH-EAST.</b>                |                |             |                   |                         | Lyndoch .....                 | 3·29           | 5·81        | 6·54              | 23·58                   |
| Yunta .....                       | 0·79           | 4·79        | 3·30              | 8·46                    | Williamstown...               | 4·16           | 7·30        | 7·81              | 27·71                   |
| Waukaringa .....                  | 0·70           | 4·29        | 2·98              | 8·06                    | <b>ADELAIDE PLAINS.</b>       |                |             |                   |                         |
| Mannahill .....                   | 1·05           | 3·64        | 3·26              | 8·31                    | Owen .....                    | 2·42           | 5·14        | 4·48              | 13·91                   |
| Cockburn .....                    | 1·96           | 6·90        | 3·20              | 7·93                    | Mallala .....                 | 2·33           | 4·41        | 5·39              | 16·67                   |
| Broken Hill, N.S.W.               | 1·71           | 7·47        | 3·80              | 9·61                    | Roseworthy ...                | 3·53           | 6·28        | 5·36              | 17·38                   |
| <b>LOWER NORTH.</b>               |                |             |                   |                         | Gawler .....                  | 3·34           | 5·81        | 6·24              | 19·06                   |
| Port Pirie .....                  | 1·55           | 3·97        | 4·69              | 13·25                   | Two Wells .....               | 2·19           | 4·52        | 5·20              | 15·81                   |
| Port Broughton ..                 | 2·32           | 4·74        | 4·61              | 14·02                   | Virginia .....                | 2·71           | 5·16        | 5·58              | 17·23                   |
| Bute .....                        | 2·15           | 3·82        | 4·83              | 15·48                   | Smithfield .....              | 3·46           | 6·63        | 5·42              | 17·51                   |
| Laura .....                       | 1·85           | 4·02        | 5·54              | 18·11                   | Salisbury .....               | 2·86           | 5·04        | 6·07              | 18·60                   |
| Caltowie .....                    | 2·03           | 3·91        | 5·28              | 16·85                   | Adelaide .....                | 2·99           | 6·15        | 6·91              | 21·12                   |
| Jamestown .....                   | 2·32           | 4·34        | 5·30              | 17·84                   | Glen Osmond ..                | 3·50           | 6·92        | 7·89              | 26·06                   |
| Gladstone .....                   | 2·27           | 4·42        | 5·03              | 16·40                   | Magill .....                  | 3·69           | 7·06        | 8·00              | 25·61                   |
| Crystal Brook ....                | 1·77           | 4·17        | 5·02              | 15·87                   | <b>MOUNT LOFTY RANGES.</b>    |                |             |                   |                         |
| Georgetown .....                  | 2·40           | 4·85        | 5·82              | 18·47                   | Tentree Gully ...             | 4·45           | 7·64        | 8·33              | 27·53                   |
| Narridy .....                     | 2·05           | 4·17        | 5·10              | 15·93                   | Stirling West ..              | 7·17           | 14·25       | 13·58             | 46·90                   |
| Redhill .....                     | 2·34           | 4·45        | 5·17              | 16·63                   | Uraidla .....                 | 5·86           | 11·48       | 12·89             | 44·11                   |
| Spalding .....                    | 2·37           | 4·66        | 5·41              | 19·34                   | Clarendon .....               | 3·89           | 8·52        | 10·13             | 32·91                   |
| Gulnare .....                     | 2·97           | 5·94        | 5·34              | 18·74                   | Morphett Vale .               | 3·30           | 6·98        | 7·12              | 22·69                   |
| Yacka .....                       | 2·70           | 5·15        | 4·78              | 15·35                   | Noarlunga .....               | 3·06           | 5·97        | 6·44              | 20·40                   |
| Koolunga .....                    | 1·99           | 4·42        | 4·77              | 15·52                   | Willunga .....                | 5·66           | 9·20        | 8·19              | 26·02                   |
| Snowtown .....                    | 2·75           | 5·46        | 4·92              | 15·70                   | Aldinga .....                 | 4·29           | 7·29        | 6·29              | 20·25                   |



## RAINFALL—continued.

| Station.                         | For May, 1931. | To end May. | Av'ge to end May. | Av'ge Annual Rain-fall. | Station.                             | For May, 1931. | To end May. | Av'ge to end May. | Av'ge Annual Rain-fall. |
|----------------------------------|----------------|-------------|-------------------|-------------------------|--------------------------------------|----------------|-------------|-------------------|-------------------------|
| <b>MOUNT LOFTY RANGES—contd.</b> |                |             |                   |                         | <b>WEST OF SPENCER'S GULF—contd.</b> |                |             |                   |                         |
| Myponga .....                    | 5-56           | 9-30        | 8-33              | 29-14                   | Rudall .....                         | 1-48           | 3-31        | 3-97              | *12-07                  |
| Normanville .....                | 2-98           | 5-71        | 6-50              | 20-73                   | Cleve .....                          | 3-06           | 6-31        | 4-76              | 14-61                   |
| Yankalilla .....                 | 4-10           | 6-87        | 7-17              | 22-95                   | Cowell .....                         | 1-23           | 2-78        | 4-21              | 11-16                   |
| Mount Pleasant ..                | 3-18           | 6-82        | 7-72              | 27-29                   | Miltalie .....                       | 1-49           | 4-76        | 4-22              | 13-59                   |
| Birdwood .....                   | 3-61           | 6-73        | 8-06              | 29-28                   | Darke's Peak ..                      | 2-19           | 4-90        | 4-12              | 14-98                   |
| Gumerscha .....                  | 4-72           | 9-11        | 9-64              | 33-45                   | Kimba .....                          | 2-13           | 4-28        | 3-74              | *11-50                  |
| Millbrook Reservoir              | 5-09           | 9-24        | 9-70              | 35-55                   |                                      |                |             |                   |                         |
| Tweedvale .....                  | 4-51           | 8-69        | 9-74              | 35-96                   |                                      |                |             |                   |                         |
| Woodside .....                   | 4-25           | 8-17        | 8-86              | 32-38                   |                                      |                |             |                   |                         |
| Ambleside .....                  | 3-99           | 8-20        | 9-69              | 35-02                   |                                      |                |             |                   |                         |
| Nairne .....                     | 3-25           | 7-31        | 8-31              | 28-22                   |                                      |                |             |                   |                         |
| Mount Barker ....                | 4-16           | 9-33        | 9-31              | 31-71                   |                                      |                |             |                   |                         |
| Echunga .....                    | 4-49           | 8-56        | 10-01             | 33-29                   |                                      |                |             |                   |                         |
| Macclesfield .....               | 4-42           | 9-35        | 8-85              | 30-62                   |                                      |                |             |                   |                         |
| Meadows .....                    | 5-62           | 9-81        | 10-67             | 36-34                   |                                      |                |             |                   |                         |
| Strathalbyn .....                | 2-55           | 5-67        | 6-16              | 19-43                   |                                      |                |             |                   |                         |
| <b>MURRAY FLATS AND VALLEY.</b>  |                |             |                   |                         | <b>YORKE PENINSULA.</b>              |                |             |                   |                         |
| Meningie .....                   | 2-02           | 4-33        | 5-88              | 18-46                   | Walleraro .....                      | 2-00           | 4-20        | 4-95              | 13-94                   |
| Milang .....                     | 1-94           | 4-45        | 4-95              | 15-05                   | Kadina .....                         | 2-26           | 4-16        | 5-31              | 15-71                   |
| Langhorne's Creek                | 1-98           | 4-68        | 4-72              | 14-80                   | Moonta .....                         | 2-49           | 4-43        | 5-26              | 15-10                   |
| Wellington .....                 | 1-81           | 5-14        | 4-95              | 14-64                   | Paakeville .....                     | 1-60           | 3-13        | 4-86              | 15-64                   |
| Tailem Bend .....                | 2-16           | 6-57        | 5-75              | 14-66                   | Maitland .....                       | 3-04           | 5-27        | 6-39              | 19-97                   |
| Murray Bridge ....               | 1-42           | 3-73        | 4-66              | 13-76                   | Ardrossan .....                      | 2-58           | 4-47        | 4-55              | 14-00                   |
| Callington .....                 | 1-81           | 4-17        | 4-85              | 15-31                   | Port Victoria ..                     | 2-63           | 4-70        | 5-03              | 15-44                   |
| Mannum .....                     | 1-30           | 4-05        | 4-14              | 11-53                   | Curramulka ....                      | 3-12           | 5-39        | 5-34              | 17-92                   |
| Palmer .....                     | 1-61           | 3-59        | 4-48              | 15-55                   | Minlaton .....                       | 2-59           | 4-96        | 5-43              | 17-90                   |
| Sedan .....                      | 1-43           | 3-29        | 4-01              | 12-16                   | Port Vincent ...                     | 2-16           | 3-73        | 4-16              | 14-56                   |
| Swan Reach .....                 | 1-85           | 4-50        | 3-61              | 10-65                   | Brentwood .....                      | 2-19           | 4-38        | 4-62              | 15-52                   |
| Blanchetown .....                | 1-13           | 3-49        | 4-37              | 11-14                   | Stansbury .....                      | 2-63           | 4-97        | 5-17              | 16-89                   |
| Eudunda .....                    | 2-63           | 6-35        | 5-28              | 17-13                   | Warooka .....                        | 2-45           | 4-64        | 5-28              | 17-60                   |
| Sutherlands .....                | 1-64           | 4-40        | 3-29              | 10-79                   | Yorketown ....                       | 3-03           | 5-65        | 5-12              | 16-98                   |
| Morgan .....                     | 1-14           | 2-52        | 3-25              | 9-17                    | Edithburgh .....                     | 2-19           | 4-52        | 5-25              | 16-44                   |
| Waikerie .....                   | 1-32           | 3-08        | 3-33              | 9-61                    |                                      |                |             |                   |                         |
| Overland Corner ..               | 1-05           | 2-38        | 3-86              | 10-50                   |                                      |                |             |                   |                         |
| Loxton .....                     | 0-92           | 3-74        | 4-15              | 11-60                   |                                      |                |             |                   |                         |
| Renmark .....                    | 1-18           | 2-86        | 3-67              | 10-52                   |                                      |                |             |                   |                         |
| <b>WEST OF SPENCER'S GULF.</b>   |                |             |                   |                         | <b>SOUTH AND SOUTH-EAST.</b>         |                |             |                   |                         |
| Eucula .....                     | 2-23           | 4-83        | 4-45              | *9-96                   | Cape Borda ....                      | 3-93           | 6-33        | 7-17              | 24-76                   |
| Nullarbor .....                  | 2-40           | 6-24        | 3-33              | *8-62                   | Kingscote .....                      | 2-16           | 4-83        | 5-78              | 19-05                   |
| Fowler's Bay .....               | 2-32           | 7-88        | 3-88              | 11-76                   | Penneshaw ....                       | 2-00           | 7-27        | 5-26              | 18-65                   |
| Penong .....                     | 5-00           | 10-55       | 3-91              | 11-94                   | Victor Harbor ..                     | 3-36           | 6-70        | 6-66              | 21-33                   |
| Koonibba .....                   | 2-55           | 8-46        | 3-50              | *11-64                  | Port Elliot .....                    | 3-29           | 5-71        | 6-42              | 20-02                   |
| Denial Bay .....                 | 2-74           | 7-00        | 3-67              | *11-31                  | Goolwa .....                         | 3-65           | 5-73        | 5-90              | 17-87                   |
| Ceduna .....                     | 1-81           | 6-33        | 3-03              | 9-82                    | Copeville .....                      | 1-55           | 4-23        | 3-52              | 11-58                   |
| Smoky Bay .....                  | 1-62           | 4-08        | 3-04              | 10-44                   | Meribah .....                        | 1-32           | 2-99        | 4-47              | *11-34                  |
| Wirrulla .....                   | 2-05           | 5-19        | —                 | *                       | Alawoona .....                       | 1-10           | 3-10        | 3-59              | *9-98                   |
| Streaky Bay .....                | 2-36           | 5-01        | 4-32              | 14-91                   | Mindarie .....                       | 1-34           | 3-60        | 3-46              | 11-88                   |
| Chandada .....                   | 2-08           | 4-73        | —                 | —                       | Sandalwood ....                      | 1-77           | 4-34        | 4-25              | 13-67                   |
| Minnipa .....                    | 2-54           | 5-65        | 3-97              | 13-73                   | Karoonda .....                       | 1-42           | 4-67        | 4-65              | 14-37                   |
| Kyancutta .....                  | 1-84           | 4-43        | —                 | —                       | Pinnaroo .....                       | 1-48           | 4-37        | 4-91              | 14-70                   |
| Talia .....                      | 2-26           | 4-95        | 3-58              | 14-76                   | Parilla .....                        | 1-28           | 3-98        | 4-38              | 13-95                   |
| Port Elliston .....              | 2-24           | 6-05        | 4-43              | 16-47                   | Lameroo .....                        | 1-25           | 3-98        | 5-09              | 16-19                   |
| Yeelanna .....                   | 2-37           | 3-88        | 3-98              | 16-03                   | Parrakie .....                       | 1-22           | 3-89        | 4-58              | 14-52                   |
| Cummins .....                    | 2-27           | 3-48        | 4-19              | 17-77                   | Geranium .....                       | 1-58           | 4-67        | 5-17              | 16-49                   |
| Port Lincoln .....               | 2-65           | 4-78        | 5-63              | 19-45                   | Peake .....                          | 1-09           | 3-58        | 5-24              | 16-30                   |
| Tumby .....                      | 1-55           | 3-14        | 3-90              | 14-14                   | Cooke's Plains ..                    | 1-73           | 4-11        | 4-84              | 15-47                   |
| Ungarra .....                    | 3-12           | 5-50        | 4-33              | 16-83                   | Coomandook ....                      | 2-23           | 4-62        | 5-29              | 17-34                   |
| Carrow .....                     | 2-92           | 4-76        | 3-71              | 13-38                   | Coonalpyn .....                      | 2-38           | 5-42        | 5-39              | 17-51                   |
| Arno Bay .....                   | 1-54           | 4-13        | 3-92              | 12-46                   | Tintinara .....                      | 1-77           | 4-65        | 5-83              | 18-81                   |
|                                  |                |             |                   |                         | Keith .....                          | 1-99           | 4-98        | 5-63              | 17-93                   |
|                                  |                |             |                   |                         | Bordertown ....                      | 1-44           | 4-23        | 5-95              | 19-35                   |
|                                  |                |             |                   |                         | Walseley .....                       | 2-05           | 5-12        | 5-63              | 18-41                   |
|                                  |                |             |                   |                         | Frances .....                        | 2-05           | 5-15        | 5-95              | 19-94                   |
|                                  |                |             |                   |                         | Naracoorte ....                      | 3-03           | 7-72        | 6-69              | 22-58                   |
|                                  |                |             |                   |                         | Penola .....                         | 2-88           | 7-92        | 7-94              | 26-15                   |
|                                  |                |             |                   |                         | Lucindale .....                      | 2-94           | 7-84        | 6-68              | 23-07                   |
|                                  |                |             |                   |                         | Kingston .....                       | 5-19           | 9-32        | 7-33              | 24-37                   |
|                                  |                |             |                   |                         | Robe .....                           | 4-52           | 8-32        | 7-37              | 24-61                   |
|                                  |                |             |                   |                         | Beachport .....                      | 4-26           | 8-17        | 8-11              | 26-97                   |
|                                  |                |             |                   |                         | Millicent .....                      | 4-66           | 9-50        | 9-12              | 29-79                   |
|                                  |                |             |                   |                         | Kalangadoo ....                      | 3-87           | 9-77        | 9-61              | 32-34                   |
|                                  |                |             |                   |                         | Mount Gambier ..                     | 3-73           | 8-57        | 9-63              | 30-74                   |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucula (1), Wirrulla (1).



# AGRICULTURAL BUREAU REPORTS

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

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| Aldinga .....           | *               | —                  | —      | Eurella .....                   | *               | 13                 | 11    |
| Allandale East .....    | *               | 26                 | 24     | Eurella Women's .....           | *               | 3                  | 1     |
| Aima .....              | *               | —                  | —      | Everard East .....              | 1195            | —                  | —     |
| Amyton .....            | *               | —                  | —      | Farrell's Flat .....            | *               | 26                 | 31    |
| Angaston .....          | *               | —                  | —      | Finniss .....                   | *               | —                  | —     |
| Appila .....            | *               | —                  | —      | Gawler River .....              | *               | —                  | —     |
| Appila-Yarrowie .....   | †               | 5                  | 3      | Georgetown .....                | *               | 27                 | 25    |
| Arbuthnot .....         | †               | 24                 | 22     | Geranium .....                  | *               | 27                 | 25    |
| Ashbourne .....         | †               | 24                 | 22     | Gladstone .....                 | *               | 26                 | 24    |
| Auburn .....            | †               | 24                 | 22     | Gladstone Women's .....         | 1184            | 12                 | 10    |
| Auburn Women's .....    | 1184            | E                  | E      | Glencoe .....                   | *               | 9                  | 14    |
| Balakiava .....         | *               | 22                 | —      | Glossop .....                   | *               | —                  | —     |
| Balhannah .....         | *               | —                  | —      | Goode .....                     | *               | 3                  | 29    |
| Barnara .....           | *               | —                  | —      | Goode Women's .....             | 1186            | 3                  | 29    |
| Bestaloo Valley .....   | *               | 1                  | 27     | Greenock .....                  | †               | 8                  | 6     |
| Belalie North .....     | *               | E                  | E      | Green Patch .....               | †               | 26                 | 23    |
| Belalie Women's .....   | †               | 9                  | 2      | Guinare .....                   | *               | —                  | —     |
| Berri .....             | †               | 3                  | 29     | Gumeracha .....                 | *               | 1                  | 27    |
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| Black Springs .....     | *               | 30                 | 28     | Hawker .....                    | *               | 2                  | 30    |
| Blackwood .....         | †               | 8                  | 13     | Hookina .....                   | *               | —                  | —     |
| Block B .....           | †               | —                  | —      | Hoyleton .....                  | *               | 15                 | 20    |
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| Borrika .....           | *               | —                  | —      | Kalangadoo .....                | *               | 9                  | 14    |
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| Brentwood .....         | †               | 4                  | 2      | Kangarilla .....                | 1221            | —                  | —     |
| Brinkley .....          | †               | 24                 | 29     | Kangarilla Women's .....        | 1186            | 18                 | 16    |
| Brinkworth .....        | †               | 1                  | 27     | Kanmantoo .....                 | *               | 16                 | —     |
| Brownlow .....          | †               | —                  | 1 & 29 | Kanni .....                     | 1213            | —                  | —     |
| Buchanan .....          | †               | —                  | —      | Kapinnie .....                  | *               | —                  | —     |
| Bugle .....             | *               | 9                  | 14     | Kapunda .....                   | *               | —                  | 10    |
| Bundaleer Springs ..... | *               | —                  | —      | Karcultaby .....                | *               | 12                 | —     |
| Bunora .....            | *               | 1                  | 29     | Karonda .....                   | *               | —                  | 29    |
| Bute .....              | *               | 18                 | 16     | Katla .....                     | *               | 3                  | 23    |
| Butler .....            | *               | —                  | —      | Kelly .....                     | †               | 25                 | 25    |
| Calca .....             | †               | —                  | —      | Ki Ki .....                     | †               | 27                 | —     |
| Cadell .....            | †               | —                  | —      | Kilkerran .....                 | †               | —                  | —     |
| Catlip .....            | *               | 2                  | 7      | Kongorong .....                 | †               | 25                 | 27    |
| Catlowie .....          | †               | —                  | —      | Koolunga .....                  | †               | —                  | —     |
| Cawowie Belt .....      | *               | 24                 | 22     | Koonibba .....                  | *               | —                  | 23    |
| Cearlue .....           | *               | 24                 | 29     | Koonunga .....                  | *               | 25                 | —     |
| Carrow .....            | *               | —                  | —      | Koppio .....                    | 1205            | —                  | 27    |
| Chandada .....          | *               | —                  | —      | Kringin .....                   | *               | 1                  | 27    |
| Charra .....            | †               | —                  | —      | Kulkawirra .....                | 1214            | 1                  | 14    |
| Cherry Gardens .....    | †               | 27                 | —      | Kyancutta .....                 | 1206            | 9                  | 7     |
| Chandfield .....        | *               | —                  | —      | Kybybolite .....                | *               | 2                  | 23    |
| Clare .....             | *               | 2                  | 7      | Lameroo .....                   | †               | 2 & 30             | 25    |
| Clarendon .....         | 1 & 29          | 27                 | 2      | Langhorne's Creek .....         | †               | 27                 | 22    |
| Cleve .....             | 1204            | 4                  | 2      | Laura .....                     | †               | 24                 | 25    |
| Cobdogla .....          | *               | —                  | —      | Laura Bay .....                 | 1206            | 27                 | —     |
| Coffie .....            | *               | 3                  | 1      | Lenswood and Forest Range ..... | †               | —                  | —     |
| Colton .....            | *               | —                  | —      | Light's Pass .....              | 1195            | —                  | 27    |
| Coomandook .....        | *               | 26                 | 31     | Lipson .....                    | *               | 1                  | 25    |
| Coomalpyne .....        | *               | —                  | —      | Lone Gum and Monash .....       | *               | 27                 | 29    |
| Coomawarra .....        | *               | 4                  | 30     | Lone Pine .....                 | *               | 24                 | —     |
| Coorabie .....          | *               | —                  | —      | Longwood .....                  | 1222            | —                  | —     |
| Copeville .....         | *               | —                  | —      | Lowbank .....                   | †               | 24                 | 29    |
| Couta .....             | *               | —                  | —      | Lorton .....                    | †               | 12                 | 10    |
| Cradock .....           | *               | —                  | —      | Lucindale .....                 | *               | —                  | —     |
| Cummins .....           | 1205            | 12                 | 10     | Lyndoch .....                   | †               | 30                 | 28    |
| Cungena .....           | *               | E                  | 2      | McLaren Flat .....              | *               | —                  | —     |
| Currency Creek .....    | *               | 1                  | 27     | MacGillivray .....              | *               | 30                 | 28    |
| Cygnet River .....      | *               | —                  | —      | Mallala .....                   | *               | 15                 | 20    |
| Darke's Peak .....      | *               | —                  | —      | Mattee .....                    | *               | 30                 | 28    |
| Dudley .....            | *               | —                  | —      | Mangalo .....                   | 1207            | —                  | —     |
| Edinville .....         | *               | —                  | —      | Mannanarie .....                | *               | —                  | —     |
| Elbow Hill .....        | 1205            | 30                 | 28     |                                 |                 |                    |       |



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| Meadows .....              | †               | 24                 | 29    | Rosedale .....               | 1199            | —                  | —     |
| Meribah .....              | †               | 8                  | 13    | Roseworthy .....             | *               | —                  | —     |
| Milang .....               | †               | 18                 | 11    | Rosy Pine .....              | *               | —                  | —     |
| Millicent .....            | †               | 25                 | 23    | Rudall .....                 | *               | 23                 | 28    |
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| Mount Gambler .....        | †               | 12                 | 10    | Streaky Bay .....            | 1209            | 26                 | 24    |
| Mount Hope .....           | †               | 23                 | 28    | Tallem Bend .....            | *               | 4                  | 30    |
| Mount Pleasant .....       | †               | —                  | —     | Talla .....                  | *               | 26                 | 31    |
| Mount Remarkable .....     | †               | —                  | —     | Tantanoola .....             | †               | 6                  | 4     |
| Mount Schank .....         | †               | —                  | —     | Taplan .....                 | *               | —                  | 28    |
| Mudamuckla .....           | †               | 13                 | 11    | Taragoro .....               | †               | —                  | 23    |
| Mundalla .....             | †               | 25                 | 30    | Tarcowie .....               | *               | —                  | —     |
| Murray Bridge .....        | *               | —                  | —     | Tarlee .....                 | *               | —                  | —     |
| Murraytown .....           | 1195            | 24                 | 27    | Tatara .....                 | *               | —                  | —     |
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| Nantawarra .....           | 1198            | 25                 | 23    | Truro .....                  | †               | 18                 | 13    |
| Naracoorte .....           | *               | 13                 | 11    | Tulkinara .....              | †               | 4                  | 30    |
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| North Booborowie .....     | *               | 1                  | 27    | Virginia .....               | †               | —                  | —     |
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| Nunkeri .....              | *               | 24                 | 22    | Walkerie .....               | *               | 12                 | 10    |
| O'Loughlin .....           | *               | 8                  | 13    | Wallala .....                | 1211            | 10                 | 8     |
| Orroroo .....              | *               | —                  | —     | Wanbi .....                  | *               | 24                 | 22    |
| Overland Corner .....      | †               | 23                 | 23    | Wandearah .....              | †               | —                  | 28    |
| Owen .....                 | *               | 20                 | 24    | Warcoole .....               | *               | 30                 | 25    |
| Palable .....              | 1207            | —                  | —     | Warcoole Women's .....       | *               | —                  | —     |
| Parilla .....              | †               | 9                  | —     | Warramboo .....              | 1211            | 23                 | 28    |
| Parilla Women's .....      | †               | 19                 | 17    | Wasleys .....                | †               | 11                 | 19    |
| Parilla Well .....         | *               | 1                  | 21    | Wasleys Women's .....        | *               | 4                  | 2     |
| Parilla Well Women's ..... | *               | 30                 | 21    | Watervale .....              | *               | —                  | —     |
| Parrakie .....             | *               | —                  | —     | Wauralte .....               | *               | 23                 | 28    |
| Parrakie Women's .....     | 23              | 28                 | —     | Weavers .....                | 1203            | 8                  | 13    |
| Paruna .....               | *               | 5                  | 3     | Wepowie .....                | 1194            | 22                 | 27    |
| Pasterville .....          | *               | 30                 | 28    | White's River .....          | *               | 9                  | 14    |
| Pata .....                 | *               | 5                  | 3     | Whyte-Yarcoole .....         | *               | —                  | —     |
| Penneshaw .....            | *               | —                  | —     | Wilkawatt Women's .....      | *               | 23                 | 21    |
| Pemola .....               | †               | 6                  | 4     | Williamstown Women's .....   | 1187            | 3                  | 1     |
| Penwortham .....           | †               | 25                 | 23    | Williamstown .....           | *               | —                  | —     |
| Petersville .....          | 1202            | 23                 | 28    | Willowie .....               | *               | 22                 | 27    |
| Petina .....               | *               | 23                 | 25    | Wilmington .....             | †               | 16                 | 21    |
| Pimbong .....              | †               | —                  | —     | Windsor .....                | *               | —                  | —     |
| Pinkawilline .....         | †               | —                  | —     | Wirrabara .....              | *               | —                  | —     |
| Pinnaroo .....             | †               | —                  | —     | Wirrilla .....               | 1200            | 27                 | 25    |
| Pinnaroo Women's .....     | †               | 5                  | 3     | Wirrilla Women's .....       | 1188            | 4                  | 8     |
| Poochera .....             | †               | —                  | —     | Wirrulla .....               | *               | 17                 | 15    |
| Port Elliot .....          | 1222            | 19                 | —     | Wolseley .....               | 1191            | 8                  | 13    |
| Fygery .....               | 1208            | 27                 | 25    | Wudinna .....                | *               | —                  | —     |
| Quorn .....                | *               | —                  | —     | Wynarka .....                | *               | —                  | —     |
| Ramco .....                | †               | 1                  | 27    | Yacka .....                  | *               | —                  | —     |
| Rapid Bay .....            | †               | 11                 | 9     | Yadnarie .....               | †               | 23                 | 28    |
| Redhill .....              | †               | —                  | —     | Yallunda Flat .....          | *               | —                  | —     |
| Remdelaham .....           | *               | 27                 | 28    | Yandiah .....                | †               | 12                 | 10    |
| Renmark .....              | *               | —                  | —     | Yaninee .....                | *               | —                  | —     |
| Rhynde .....               | *               | —                  | —     | Yantanable .....             | *               | —                  | —     |
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\* No report received during the month of May.

† Held over.

x In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS. WOMEN'S BRANCHES.

AUBURN (Average annual rainfall, 24.08in.).

April 24th.

The meeting was held at the homestead of Mrs. L. Giles, there being six members and two visitors present. The meeting took the form of a Question Box, and household hints and some useful knowledge gained as a result. The following household hints were read by Mrs. Giles:—If turpentine, methylated spirits, or petrol is mixed with blacklead, it makes a better polish, and is easier to shine. Motor tubes cut in strips make a very good substitute for elastic, and can be used for garters or bands and legs of bloomers. It will not perish in the wash as elastic and will wear much longer. A tablespoon of vinegar mixed with a handful of salt will clean a copper perfectly in a few minutes. When making tomato sandwiches, reject the seeds; this will prevent the sandwiches from becoming too moist. If a lid is placed on a pan when frying eggs they will cook through more quickly and will not need to be turned or basted; it is better to put the pan on the side of the stove and cook slowly. When cutting up onions, do so near an open window; the breeze from the open window will blow the spray away from you and so will not make tears come into the eyes. A clear varnish on linoleum will make a good lasting polish. Clear varnish will remove marks on a stained table. Methylated spirits used with G.P. powder makes a good polish for silver. Other members also contributed useful hints. (Secretary, Miss L. Dennison.)

GLADSTONE (Average annual rainfall, 16.40in.).

April 10th.—Present: 18 members.

RECIPES.—The following recipes were supplied:—*Tea Cake for Children* (Miss Teague).—1lb. S.R. flour, ½lb. lard or dripping, ½lb. currants, ½ cup sugar, 1 egg, ½oz. ground ginger. Bake 1½ hours. *Cheap Plain Cake* (Mrs. Pritchard).—2 eggs, 1 cup sugar, ½ cup milk, 2 cups S.R. flour, ½lb. butter, vanilla to taste. Add butter last and it must be melted. Cook in moderate oven 1 hour. *Quince and Melon Jam* (Mrs. Leverington).—Take 5lbs. melon, 3lbs. quinces, 6lbs. sugar. Pare the melon and remove seeds; cut into discs; sprinkle with a few pounds of the sugar and allow to stand over night. Boil 1 hour. Pare, core, and cut up quinces. Stew for 1 hour with a few cups of juice from the boiling melon; then put the two together and add rest of sugar and boil 3 hours. *Coffee Rolls* (Mrs. R. E. Lines).—1lb. S.R. flour, pinch salt, 3ozs. butter, 2ozs. sugar, 1 egg. Beat butter and sugar to a cream; add egg, then ½ pint milk, then flour. Mix well with a wooden spoon. Roll out ½in. thick and cut with biscuit cutter and double over, and brush with milk. Cook in hot oven. *Ginger Pudding* (Mrs. Durrant).—Take 6ozs. flour, 3ozs. suet, 1 tablespoon sugar, ½ teaspoon mixed spice, ½ teaspoon C. soda, ½ cup milk, ½ teaspoon ground ginger, 2 tablespoons golden syrup. Steam 1½ hours. *Coffee Essence Cake* (Mrs. Thomas).—4ozs. butter, 4ozs. sugar, beaten together; add 2 well beaten eggs, 6ozs. S.R. flour, 1 tablespoon coffee essence. Bake in sandwich tins. *Salad Dressing to Keep* (Mrs. Humphreys).—1 tablespoon of butter, 1 tablespoon mustard, 3 eggs, 1 cup sugar, 1 cup vinegar, 1 cup milk, and salt to taste. Bring ingredients to boil and add vinegar. *Savoury Omelette* (Mrs C. H. Lines).—Chop up finely 1 large onion and cook till tender. Beat 2 eggs, add 1 tablespoon S.R. flour, 2 tablespoons milk or cream, add pepper and salt to taste. Have ready a frying pan of boiling fat; drop a tablespoon of mixture in at a time. *Jewish Cake* (Mrs. Hackworth).—½lb. butter, 1 cup sugar, 2 eggs, 1½ cups S.R. flour, ½ teaspoon ginger, ½ teaspoon cinnamon, ½ cup warm milk and in it dissolve 1 tablespoon treacle. *Orange Pudding* (Mrs. Smallacombe).—1 tablespoon butter, 2 eggs, 1 cup sugar, 2 cups S.R. flour, 1 grated orange. Steam 2 hours and serve with custard. *Three Minute Sponge* (Miss Sargent).—1 cup flour, 1 small cup sugar, break in 3 eggs, then 1 tablespoon butter, 2 tablespoons milk, and 1 teaspoon C. soda and 2 C. tartar. Put all together in a dish and beat quickly for 3 minutes and cook 20 minutes. (Secretary, Miss M. J. Sargent.)



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GOODE (Average annual rainfall, 9.82in.).

April 1st.—Present: 12 members and 13 visitors.

**COOKING DISPLAY.**—Prizes were given by certificates. Those gaining prizes were as follows:—Mrs. B. O. Klau, sponge sandwich, decorated cake, two nut loaves (light and dark), lamington squares; Miss H. Linke, home-made bread; Miss P. Linke, pound cake, collection of biscuits; Mrs. J. Kelly, cream puffs, ribbon cake; Mrs. A. E. Watson, sponge roll, scones; Miss C. Paech, collection of home-made sweets; Miss D. Tucker, sausage rolls; Miss V. Linke, yeast buns; Mrs. H. B. Linke, Belgian cake; Mrs. B. O. Klau, jam, sauce, chutney, mixed pickles, and vinegar pickles; Mrs. B. O. Klau, home-made soap. **Vegetables.**—Mrs. J. Quick, pie melon and tomatoes; Mrs. J. Kelly, apple cucumbers. **Needlework.**—Mrs. B. O. Klau, supper cloth, canvas work; Miss V. Linke, toilet set, Richelieu work, d'oyley, tray cloth; Miss M. Smith, white work, cushion, three d'oyleys; Miss H. Linke, table centre; Miss J. Smith, eyelet worked d'oyley; Mrs. A. E. Watson, child's dress; Mrs. D. Fagan, paper flowers. **Children's Needlework.** Miss D. Stasinowski, best dressed doll; Miss T. Paech, worked pinafore; Miss I. Paech, d'oyley; Miss D. Linke, worked garment. A special prize (trophy) was given by Mrs. B. O. Klau for the one who gained the most prizes for the evening; won by Mrs. Klau. A special prize (trophy) was given by Mrs. D. Fagan for the best piece of needlework; won by Miss V. Linke. A special prize (trophy) was given by Mrs. A. E. Watson for the best piece of needlework in the children's section; won by Miss D. Stasinowski. Judges—Cooking, &c., Mrs. E. M. Lutz; vegetables, Mr. W. H. Brownrigg; needlework, Miss M. Tucker.

**SALADS.**—Meeting held May 6th.—Present: Five members and three visitors.—Miss V. Linke gave a demonstration on the method of preparing a lettuce salad. Mrs. Paech also gave a demonstration of making potato salad, which can be made from old potatoes if new ones are not to be had. Method—Boil three large potatoes and slice (or mash if preferred). Fry a little bacon, cut in squares, and when both bacon and fat from the frying are cool, mix with a little vinegar to taste; add salt and pepper and sugar and cream. Pour over the potatoes. Sprinkle the top with finely chopped eschalot and a little parsley. Miss V. Linke read the following paper:—The absolute drying of the lettuce leaves is a necessity for a good salad. It is essential that salads should be served very cold. Many people like a dusting of sugar with most salads. A tomato salad is incomplete without it. Cold, white fish blends well with a potato salad. Most of the salads where oil is used may have substituted for it cream, if oil is not liked. With a French salad, the essential of success is in the slow and careful blending, without any taste of oil or vinegar, but a blend of both, and the dryness of the lettuce leaves to ensure the absorbing of the oil. French salad dressing is made as follows:—Three tablespoons of olive oil (or cream), 1 saltspoon of salt, 1 saltspoon of pepper, 1 table-spoon of vinegar. (Secretary, Mrs. A. Watson, Ceduna.)

KALANGADOO (Average annual rainfall, 32.34in.).

April 11th.—Present: 12 members.

**USES FOR OLD TELEPHONE DIRECTORIES.**—Miss Kennedy read the following paper:—“I have two directories hanging on the wall by the kitchen stove. When lighting the stove fire in the morning, a couple of leaves are torn out, and with some deal or small wood make the foundation of the fire. If the frying pan is used for cooking the breakfast, the fat is drained out and a couple of more leaves used to wipe out the pan before putting in the dishwater. A handful of pages are used for rubbing up the stove, removing any grease that has resulted from the frying. Two iron kettles used on the stove have to be lifted to the floor to be filled, and by standing them on a directory, the lino is saved from any black or scorch marks. When taking stewed fruit or boiled custard off the fire, the saucepan is stood on a directory on the table until sufficiently cool to pour into glass dishes or custard glasses. I always use a few leaves rolled into a ball and damped for cleaning the bottoms of the enamel saucepans, I just sprinkle a little Panshine on the saucepan, and after a few rubs the bottom is free from black. A directory is always used for standing the stewpan on after making jam or pickles whilst cooling before being bottled. When washing or polishing floors, I use a book for kneeling on. I have also used one when in the garden planting seedlings or pulling weeds. There are many times through the day when one wants a piece of paper, and by having one of these books close at hand, one may save much time, and you are not likely to be tearing up a paper that some of the menfolk are saving, or perhaps requiring just at the precise moment that you are destroying it.” (Secretary, Miss A. Kennedy.)

#### KANGARILLA.

April 16th.—Present: eight members and three visitors.

**JAM MAKING.**—The monthly meeting was held at the residence of Mrs. S. Paddick. Miss E. White read the following paper:—“The successful jam and jelly maker uses only fresh fruit of the very best quality. The fruit should be placed in an enamel or aluminium preserving pan. A deep enamel basin answers as well for small boilings.



There is no definite rule as to the amount of sugar to use, but generally speaking one can safely use  $\frac{1}{2}$  lb. (good weight) to 1 lb. fruit, though I prefer 5 lb. sugar to 6 lb. fruit, and in many instances pound for pound. Melon jam should not have pound for pound of sugar, unless oranges or lemons are added. Place on the fire and boil for about three hours, and to test if it is cooked, put a little into a saucer, stand it where it will cool in three or four minutes, look at it, and tilt the saucer and see if it has little ripples and a "skin" on it. Another test is hold up the jam spoon; if a little hangs on it in a substantial "drop" it is done. Jam boiled too long often has its color spoiled or damaged. Jam should boil briskly and requires very little stirring; use a wooden spoon. It is a good plan to put a couple of marbles on the bottom of the pan to prevent the jam from 'catching,' and stirring is not required so constantly. Bottle jam in dry glass jars, seal when cold, and store until wanted for use. 'Clag' is good for pasting down jam. Fruit that is not quite ripe is best for jelly-making. Make jelly as early in the season as possible. *Quince Jelly*.—Rub all fluff off the quinces and cut in halves to allow all jelly to be extracted from the seeds. Cover with water and boil until soft, then strain twice through a jelly bag. Put 1 lb. of sugar to 1 lb. of juice, and boil until jelly sets in a saucer. *Banana Jam*.—Slice 12 bananas, and to every pound allow  $\frac{1}{2}$  lb. sugar. Add the pulp of six oranges and two lemons and boil slowly for one hour. About  $\frac{1}{4}$  oz. of essence of pineapple improves the flavor." (Secretary, Mrs. M. Steer.)

MILLICENT (Average annual rainfall, 29.79in.).

March 20th.—Present: 10 members.

POULTRY.—Discussing articles read on this subject, members who had reared turkeys stated that the birds required a good deal of attention until they were well over six weeks old. Mrs. Redman stated that she had obtained good results by feeding the young birds on chopped up boiled eggs and plenty of green feed, such as thistles, lucerne, &c., as well as crushed grain. Mrs. Varcoe, who had been keeping poultry for many years, said although her birds were provided with a shed they seldom make use of it, excepting on very wet days. They preferred to roost in trees, and were always healthy and free from vermin. They were fed on wheat and had a large run where they could obtain plenty of green feed.

To remove a glass stopper out of a bottle a member was advised to hold the neck of the bottle over a flame of a candle, turning the bottle around in the candle until it became hot, when the stopper could be easily removed.

April 17th.—Present: Seven members.

Mrs. H. Altschwager read a paper giving some useful hints on gardening. She also said that to strike Daphne cuttings, it was best to cut a piece that had flowered, place it in the earth prepared for it, and put a pickle jar over it (not one with the bottom out of it, but a closed one), and keep the ground moist. Other members gave the following recipes:—*Melon Jelly*—15 lbs. melon, 12 lemons, and 3 lbs. sugar; cut up melon and lemons (include seeds and rind), cover with water, leave stand all night, boil till a pulp—do not stir—then strain through a jelly bag. Put a cup of sugar to every cup of liquor, boil until it jellies—about 30 minutes or a little longer. *Parsley Jelly*—Put some parsley in an enamel saucepan, press it down, and cover with water, boil until well cooked, then strain, put back in saucepan, adding a cup of sugar for each cup of liquor, boil until it jellies. It is nice eaten with cold meats or for flavoring white sauces. (Secretary, Mrs. H. Varcoe.)

SADDLEWORTH (Average annual rainfall, 19.60in.).

Nine members attended the meeting held at Miss Partridge's homestead on May 5th. Mrs. Coleman gave an interesting talk on her visit to Adelaide to attend the Guide and Scout Rally held during the visit of Lord and Lady Baden-Powell. Mrs. Blundell also addressed the meeting. Miss E. Campbell, of the Education Department, visited the Branch during April and spoke on the subject, "The Use of Hessian in the Home." (Secretary, Miss D. Partridge.)

WILLIAMSTOWN (Average annual rainfall, 27.71in.).

May 6th.—Present: Nine members.

KITCHEN HINTS.—Mrs. Hill read the following paper:—"A tin plate covered with a layer of salt takes the place of an asbestos mat and prevents jams, jellies, or stews from burning. Sprinkle a handful of salt on the stove when frying and it will absorb all the splutterings of fat and save much time in cleaning. When boiling carrots, add a little dripping; the vegetable will cook quicker and the flavor will be greatly improved. To prevent custard in large tarts soaking into the pastry and becoming soggy, sprinkle the crust with flour before pouring in the custard. To prevent jam or treacle from boiling out of a roly-poly pudding, sprinkle a few bread crumbs along the edge of the paste before rolling up. If, when making bread pudding, the buttered bread is dipped into water before being placed in the pie dish, it will not soak up so much custard.



If desiccated cocoanut is put into a jar or bottle it will not soak out as it does if left in an ordinary paper package. Vegetable marrow is much more appetising when cut into pieces and cooked in a tightly closed saucepan with a little butter, pepper, and salt. To prevent green vegetables from boiling over on the stove drop one teaspoonful of dripping into the saucepan when they begin to boil. Fried onions are much more digestible if they are boiled for a few minutes and then strained and fried in the usual way."

**HINTS FOR THE HOME.**—The following paper was read by Mrs. Rowe:—When dealing with large holes in stockings, a good plan is to get a piece of net slightly larger than the hole and tack this neatly on the wrong side of the stocking, then do the darning into the net on the right side until the opening is well covered. The work is quickly and easily carried out, and in the end will be hardly visible. When sewing with double cotton, make a knot in each end instead of knotting them together, and there will be no tangles. A little liquid ammonia added to the water in which flannels are being washed prevents them from shrinking or turning yellow. To remove a scorch-mark from delicate fabrics, make a thin paste of magnesia and water and spread it over the part, first putting a cloth underneath to avoid wetting the rest of the garment. When thoroughly dry the powder will brush off, taking every sign of scorch with it. A pinch of citric acid added when making jam or marmalade will stop it from becoming sugary. Since ants dislike the smell of sage, hang bunches of the herb wherever they are likely to be troublesome. Make a scarecrow for the garden by driving in two stakes and tying a cord across from one to the other. Suspend by string from this large corks into which long feathers have been inserted. *Beeswaxed Eggs.*—Shred 2ozs. beeswax into a cup, pour enough good olive oil over to cover, melt by standing the cup in hot water. When cold the mixture should look like wax polish. Have the eggs quite clean, grease the palms of the hands and turn each egg round in them as you would when painting a golf ball. Store the eggs in containers, such as Mintie tins, but do not put lids on the tins. Eggs done this way break like fresh ones and keep from one season to the other. *Recipe Box.*—Every housewife keeps a recipe book in the kitchen, but what about a recipe box? A small fancy biscuit tin will serve the purpose. Take off the paper, enamel the tin to match the color scheme of the kitchen, and label it "Recipes." For the interior provide some good strong envelopes—those made of thick brown paper are best—and label them "Meat," "Fish," "Soup," &c.; also one for "Household Hints." The next time you see a good recipe it will take but a second to cut it out and slip it in its particular envelope in the recipe box, and when you want something different for a pudding a search through the "Pudding" envelope will provide just the very one you need. Those recipes that have been tried and proved can be entered at leisure in the recipe book." (Secretary, Mrs. A. Cundy.)

#### WIRILLA.

January 8th.—Present: 11 members.

The meeting of January 8th was held at the residence of Mrs. Blatchford. A paper, "Gelatine," was read by Mrs. S. Schunke.

**LUNCH CAKES.**—Meeting held February 5th. Present: eight members. Miss M. Evans read the following paper:—"To make cake have everything in readiness before beginning. Mix the ingredients in a graniteware, enamelled, or earthen basin. Sift the flour before using, and if baking powder is used sift together with the flour two or three times. Use white sugar unless brown is called for. Beat the whites and yolks of eggs separately: the yolks until they cease to foam and the whites to a stiff froth. Eggs will beat to a stiffer froth if cold and beaten in a cold dish in a cool room. Use earthen or china bowls or plates to beat eggs in: a bowl if an eggbeater is employed and a plate when a fork or eggwhisk is used. First beat the butter and sugar to a cream, then add the beaten yolks of eggs, and beat and stir well; then the milk and flour, and lastly the beaten whites of eggs. Have the oven less hot for cake than for bread, but hotter for thin cake than loaf cake. A cake is baked when a clean broom straw may be passed through the thickest part without any dough adhering to it. If it is necessary to move the cake after putting it in the oven, it should be done carefully; jarring it in any way is liable to make it fall and become heavy. To prevent cake from sticking to the pan, rub the pan with butter and sprinkle with flour before turning in the batter. If raisins or dried currants are used, they should first be carefully looked over, washed, and dried, and then dusted with flour. Raisins should also be seeded. A good way to wash these fruits is to put them into a colander, set the colander in a pan of warm water for a short time until the fruit becomes plump, which will loosen the sand and grit. Then rinse by dipping the colander in and out of clean water several times, and spread the fruit on a clean cloth to dry. Raisins may easily be seeded just after being washed in this way. *Ginger Layer Cake.*—In a slightly warmed basin mix  $\frac{1}{2}$  cup treacle or golden syrup, 1 cup butter, 1 cup brown sugar, and beat well. In another basin beat 3 eggs well and add  $\frac{1}{2}$  cup milk, then add to the other mixture and beat all well together. Add  $2\frac{1}{2}$  cups flour, mixed with 1 teaspoonful each of ground ginger, cinnamon, spice, and



lastly add  $\frac{1}{2}$  teaspoonful of bicarbonate of soda dissolved in a little milk and 3 teaspoonfuls of baking powder. Divide in three, put in sandwich tins and bake in moderate oven for 20 to 30 minutes. When cold, put together with icing made as follows:—Boil  $\frac{1}{2}$  cup milk, 2 cups brown sugar, and 1 tablespoonful butter together for five minutes. Remove from fire and beat until thick. Spread between cakes and on top with a knife dipped in cold water occasionally, and decorate top of cake with pieces of preserved ginger.

*Nut Loaf.*—Sift 1 teaspoonful cream of tartar and  $\frac{1}{2}$  teaspoonful carbonate soda with 2 cups flour into mixing bowl, add  $\frac{1}{2}$  cup sugar, and almonds, raisins, and dates as desired. Beat separately 2 eggs, and to them add 1 tablespoonful golden syrup and  $\frac{1}{2}$  cup milk, add the flour, and mix well. Put in well-greased tins with lids loosely on, half fill each tin, and bake one hour.

*Lunch Cakes—Buns.*—Three cups self-raising flour,  $\frac{1}{2}$  cup dripping or butter,  $\frac{1}{2}$  cup sugar, 2 eggs, a few drops of essence of lemon, and milk. Beat butter and sugar to a cream, add eggs well beaten, and then flour and sultanas or currants as desired, and enough milk to make a stiff dough. Roll in balls and dip in sugar, and bake in moderate oven.

*Sultana Cake.*—Three cups flour, 1 cup butter, 1 cup sugar, 1 cup sultanas, 4 eggs, and  $\frac{1}{2}$  cup milk. Beat butter and sugar to a cream, add eggs well beaten, then add sultanas, milk, and flour and beat well. Bake in moderate oven for one hour."

**BISCUIT MAKING.**—Meeting held April 2nd. Recipes were supplied by Mrs. Jones. Mrs. Schunke read the following paper:—"There are many recipes which anyone can follow, and there is such a variety of colorings and flavoring essences available that it is possible to suit all tastes. Biscuits can be made very attractive by different icings and fillings, and by having a number of fancy cutters. For most biscuits the butter is rubbed into the flour and the eggs well beaten with the sugar and mixed into a soft dough, rolled very thin, and cut into shapes. Most biscuits will keep for weeks crisp and nice if kept in an airtight tin. The following are three easy recipes:—*Champagne Biscuits.*—Half pound butter, 1 cup sugar, 1 egg, 2 cups flour, 1 teaspoonful cream of tartar,  $\frac{1}{2}$  teaspoonful carbonate soda, and milk to mix. Rub the butter into the flour and add egg and sugar well beaten together, enough milk (about 3 tablespoonfuls) to mix a stiff paste, add essence vanilla, roll thin, and bake quickly. *Rosella Biscuits.*—Two cups self-raising flour,  $\frac{1}{2}$  cup cornflour,  $\frac{1}{2}$  cup sugar,  $\frac{1}{2}$  lb. butter, 2 eggs, saving the white of one, and a little milk; mix ingredients well. Roll out thin and spread with white of egg beaten stiff, and add icing sugar to make a stiff paste. Sprinkle with cocoanut or chopped nuts. Cut in strips and bake. *Shortbread Creams.*—One pound flour, 2ozs. sugar,  $\frac{1}{2}$  lb. butter; beat butter to a cream, add sugar and flour sifted. Work it into a ball and roll out, cut in shapes, and bake in a moderate oven half an hour. Put two biscuits together with a filling comprised of 1 tablespoonful butter, 3 of icing sugar, and flavoring essence. These biscuits are also nice with half an almond put in the centre of each before cooking." (Secretary, Miss W. R. Jones.)

### AN EXHIBITION OF HOME CRAFTS AT GLADSTONE.

An instructive and practical feature of the work of the Women's Branch of the Agricultural Bureau at Gladstone is the encouragement of domestic crafts. An exhibition of work accomplished in the homes of members was inaugurated in 1930, and the second display was held on Wednesday, May 13th, in the Memorial Hall of the Gladstone Institute, when a large number of visitors, including members of neighboring Women's Branches at Nelshaby and Gladstone, inspected the work done during the year.

## HALMEG LINSEED MEAL

|                   |         |             |
|-------------------|---------|-------------|
| 20 BAG LOTS ..... | 11/ BAG | } ON TRUCKS |
| 10-15 " " .....   | 11/3 "  |             |
| 1-9 " " .....     | 12/6 "  |             |

FINE GROUND FOR CALVES 1/- EXTRA.

STRICTLY CASH WITH ORDER.

**Charles Whiting & Chambers Ltd.**  
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The exhibits were divided into three classes, which were open for competition:—Jams (made from dried apricots), spongecake, and a collection of articles made in the home. The entries for the latter class were not restricted to members of the Women's Branch, as the conditions provided that the collection must be made in the homes of Bureau members. Consequently, there were exhibits of such articles as furniture, made by members of the Men's Branch, and amongst the entries visitors were particularly interested in the work of Mr. T. Hackworth, who displayed a tea wagon, rug box, afternoon tea table, fire kerb, and a settee. The only materials purchased for the manufacture of the settee were the moquette and springs, the frame being made principally from a discarded harvester.

Including a special class for Christmas cake, which was judged in 1930, there were 24 competitors, some of whom entered as many as 150 articles in the home collection class. This class consisted of art needlework, dressmaking, crocheting, stencilling, knitting, painting, newinlach work, tatting, woodwork, cooking, jams, preserves, furniture, and upholstering, &c.

The attractive display of art needlework of all exhibitors was a distinguishing feature of the competition, as well as the excellent exhibits of dressmaking of various kinds, painting, cooking, and sweets entered by Mrs. R. E. Lines, who gained the highest aggregate for all classes, with 178 points out of a possible 200. Other competitors for the aggregate, in order of merit, were Mrs. T. Hackworth (170 points), Miss Sargent, Mrs. G. Smallacombe, and Miss Brown.

The competition for jams made from dried apricots (judged by Mrs. Smallacombe and Miss Jeffrey) was won by Miss M. J. Sargent, with Mrs. Hackworth second. Mrs. G. Smallacombe secured the first award for sponge cake (judged by Mesdames E. L. Orchard and H. J. Richardson), and Mrs. R. E. Lines was placed second. In the home collection class (judged by Mesdames L. Clarke and Cummings), Mrs. R. E. Lines was awarded first place, followed by Mrs. Hackworth, Miss Sargent, Mrs. Smallacombe, and Miss Brown.

Mrs. Gravestock, Miss Sargent, and Mrs. Smallacombe were placed in this order for the Christmas cake, which was judged in December last.

Prior to the general inspection of exhibits by visitors, Mrs. F. C. Spotswood, in the absence of the President (Mrs. M. A. Schmidt), presided over the meeting, and explained the objects of the exhibition, which were primarily to encourage country women to provide their homes with essential and decorative articles made by their own handiwork, and she was convinced that the large attendance of interested visitors would prove an incentive to the Gladstone Branch to continue the competitions, which were so well founded last year. She announced that the trophies won would be presented at the annual meeting of the Men's Branch, to be held later in the season.

The Secretary (Miss M. J. Sargent) was complimented on the manner in which she had carried out the details of the competition, and on the excellent work she had done for the Branch.

The visitors listened with interest to the remarks of the judges, after which addresses on the work of the Bureau were given by Messrs. H. C. Pritchard (General Secretary) and E. L. Orchard (District Agricultural Instructor).

The following ladies contributed to a musical programme before afternoon tea, which was served by members of the Branch:—Mesdames Symonds, Clarke, Glen, Osmon, and Misses Jeffrey, Lines, and Deeble.

#### *Summary of Meetings, &c.*

| Branch.       | Date of Meeting. | Members Present.   | Subject.                                          | Secretary.                 |
|---------------|------------------|--------------------|---------------------------------------------------|----------------------------|
| Belalie ..... | 7/5/31           | 15 and 25 visitors | Address—Miss E. Campbell                          | Mrs. E. Orchard, Jamestown |
| Pinnaroo ...  | 1/5/31           | 12                 | Bread and Cake Making Demonstration—Mrs. Mattiske | Mrs. F. Atze               |
| Wasleys ....  | 5/2/31           | 35                 | Address—Mrs. Maloney                              | Mrs. M. Wilson             |
| Wasleys ....  | 5/3/31           | 25                 | Address—Mrs. Dawkins                              | Mrs. M. Wilson             |
| Wasleys ....  | 2/4/31           | 17                 | Address—Rev. Nield                                | Mrs. M. Wilson             |
| Wasleys ....  | 14/4/31          | —                  | Address—Miss E. Campbell                          | Mrs. M. Wilson             |



## SOUTH-EAST DISTRICT.

WOLSELEY (Average annual rainfall, 18.30in.).

The September meeting was attended by 27 members. Mr. R. A. Grosser read a paper concerning the merits of winter and summer fallow.

A "Question Box" meeting on November 11th was attended by 22 members. In reply to the question "Does it damage fallow to work with the disc if fallow is badly infested with thistle?" Mr. Snod thought the disc preferable to leaving the thistles. Mr. Oborn had used the disc on part of the crop, and had not found it detrimental to the growth of wheat. "Does it pay to breed draught horses on the farm?" Mr. H. K. Ridgway did not think it advisable on a small farm. It would be better to buy two or three year old colts and crop the land. Mr. W. Butler thought it better to breed than to pay £30 for a horse. "Which is a good wheat to grow on stubble land?" Several members thought Waratah a good wheat. Mr. C. Ridgway had tried Major, but without success. Mr. Oborn considered Dollar was the best he had tried. (Secretary, Mr. E. Sharrad.)

January 12th.—Present: 15 members.

FARM SIDE LINES.—The following paper was contributed by Mr. W. Butler:—"All people interested in the welfare of our State will agree that wheat and wool are the principal sources from which our wealth is obtained, and in this paper on 'side lines' I am not justified in putting either of these products down as side lines. It must be admitted that without sheep on the farm—particularly the fallows—our district would not grow nearly so much wheat, so it can scarcely be reckoned as merely a side line. As this paper deals with side lines which can be made to assist the farmer to balance his budget, I think the most important side line is dairying and the rearing of young cattle. Every farmer should keep cows. With care and good management the cows should not be all in full milk at the same time, or there will be a shortage of milk and butter, perhaps just when it is most needed. If a farmer has a family able to manage a few extra cows, well and good, as it would be far better for him to do so than to think of any of his family seeking employment away from home. Separator butter is a commodity which finds a ready sale. Another side line well worth trying is the keeping of a good breed of swine. With two or three good sows one should be able to utilise the separator milk. Young pigs thrive on that kind of diet, if a little pollard or crushed wheat be added. A small paddock of clover or lucerne would prove beneficial. A supply of charcoal is a good thing to have for the pigs to eat; it helps to keep them healthy. If young pigs are not in demand, the farmer can kill and cure the pork or bacon, and it will assist in keeping down expenses. Another side line I strongly advise is poultry, especially if there are girls in the home. For laying hens I prefer White Leghorns. Egg production pays better than breeding, first because of our distance from market, and again, a young cockerel will eat a bushel or more of wheat before it is fit for market. With corn at 2s. 3d. per bushel and a bird in the market at 5s., it would be a consideration. We are frequently told that a certain breed of fowls are best because they are winter layers. I have been interested in fowls for many years, and have understood that the time of the year in which hens lay is determined by the date of hatching, and if a pullet begins to lay when nine months old—as many folk aver—it should not be a very difficult task to prove when or at what time of the year is the best for hatching. Eggs being such a valuable food and so easily and quickly cooked, makes them a line well worth venturing on, but do not expect a fortune all at once. Many people keep their hens too long, i.e., until too old to be profitable. I remember reading some years ago a report on this important subject, which stated that 12 pullets one year old would lay as many eggs in a year as 17 two-year-old hens, and as many as 24 three-year-old hens, so you should brand or mark them. Recently eggs were quoted at 5½d., to 1s. 2d. for Red Combs. The eggs which brought 1s. 2d. were guaranteed infertile. If this makes so great a difference, why keep mixed sexes running together? Would it not be better to house the best hens with a pedigree male bird, and thus obtain hens of the best laying strains. Lastly, a side line worth writing about is a good vegetable garden, as every good housewife delights in fresh vegetables, knowing they cost but little." (Secretary, Mr. E. Sharrad.)

February 9th.—Present: 24 members.

SHEEP OR WHEAT FOR THE TATARA DISTRICT.—Mr. Butler read the following paper:—"I have divided my paper into three parts, and arguments and figures are based on a farm of 500 acres: I., Sheep only; II., wheat only; III., wheat and sheep. *Sheep Only.*—I estimate one could carry 350 ewes; these would drop 80 per cent. lambs; 280 lambs from 350 ewes, wool shorn 8lb. per head at 9d., 6s. = £105. I would sell the lambs off shears at, say, 6s., and with the wool = £95. Total income £200. I estimate cost of



shearing, £30; dipping, crutching, woolpacks, &c., £10; leaving a credit of £160. *Wheat Only*.—Seeing that various experts have estimated that wheat costs 4s. a bushel to grow, that is, wages, &c., I will now only deal with a farmer who does his own team work and makes no allowance for his wages, but profits, if any, are his livelihood. I am of opinion that a man can put in 180 acres wheat each year; estimating this at 25bush. to the acre at 2s. per bushel, £450; roughly, expenses would be:—Super, £50; cornsacks, £55; wear and tear, depreciation on machinery, £50; insurance, £5; seed, £25; various small items, £50; total expenses, £235; leaving £215 profit. As regards balance of holding, I would let the grass on this for sheep for, say, £50, which would bring profit to £265. *Sheep Combined with Wheat*.—Estimating that I put 150 acres under wheat, 150 under fallow, the remaining 200 would be grazed by sheep, leaving 50 acres sown for oats, would leave 150 acres. On this I estimate 200 ewes could be kept. These would rear 150 lambs. I estimate wool from sheep and lambs at £65, lambs sold off shears £45—total £110; expenses in connection therewith, £10; credit of £100. With balance from wheat, which amounts to five-sixths of previous estimate, leaves an estimated profit of £180. Total receipts from sheep and wheat, £280. Profit as under: Sheep only, £160; wheat only, less £93—£265—£172; sheep and wheat, less £77—£280—£203. These figures are open to argument. Parts of many farms are of no use for wheat growing, being too wet, &c., whilst, on the other hand, we have good paddocks that it would be against all reason not to grow wheat on them. Some parts of the district are more suitable for wheat-growing, being close to stations and receiving yards, whilst others situated 20 miles out find carting too expensive. These figures are given as farmers who own farms. We find in the district there are many men working farms on shares. But for this system many at the present time would probably be on the dole. If we take two-thirds or one-half of my figures you do not give them much profit; the same also applies to the owner. You do not want too many eggs in the one basket, and it is sound business to combine both sheep and wheat. This is a good district, and droughts are few, so that we should grow more wheat. When we travel the district we see very little fallow compared with grass country.” (Secretary, Mr. E. Sharrad.)

*Summary of Meetings, &c.*

| Branch.       | Date of Meeting. | Members Present.   | Subject.                                          | Secretary. |
|---------------|------------------|--------------------|---------------------------------------------------|------------|
| Tintinara ... | 25/4/31          | 5 and 12 visitors  | Paper—"Diseases of Sheep in England." Mr. Helling | R. Melver  |
| Tintinara ... | 2/5/31           | 15 and 14 visitors | Address—Mr. E. S. Alcock                          | R. Melver. |
| Mundalla ...  | 30/4/31          | 15                 | Address—Mr. W. H. Downes                          | A. Ross    |
| Mt. Gambier   | 8/5/31           | 19                 | Social .....                                      | G. Gurry   |

## UPPER-NORTH DISTRICT.

### (PETERBOROUGH AND NORTHWARD.)

BLACK ROCK (Average annual rainfall, 12.50in.).

March 3rd.—Present: Six members.

**MAKING FARM LIFE ATTRACTIVE.**—Mr. G. Clarke read the following paper:—"When the work of the day is finished have a shower and change into fresh clothes. Punctuality with regard to meals and work will tend to help you through your tasks. A wireless set is a valuable asset to the man on the land; from it he receives valuable information, market reports, sporting results, and music. Outdoor recreation, such as tennis, football, golf, cricket, &c., should not be overlooked. It should be the ambition of every young man to play some sport. This takes the mind off the work of every day and gives one a brighter outlook on life." (Secretary, Mr. Kitto.)

MORCHARD (Average annual rainfall, 13.50in.).

March 6th.—Present: 10 members.

**ODD JOBS.**—Mr. H. Kupke read the following paper:—"First, I suggest attention should be given to tidying up around the house. If doors are squeaking give them a drop of oil. Mend guttering and attend to the paths before winter. Look at the roofs of sheds. A few sheets perhaps want nailing down securely. The water supply for domestic purposes should have attention. Clean all tanks and piping. Fix up drains and channels to the dam and tanks. Attend to the stables, repair stalls, feeders, and



yards, and see that the cow shed and yards are ready for winter weather. Crossings in small creeks can be fixed up, say, with a load or two of stone, or any washouts repaired. Firewood should be carted and sawn up as early as possible. Once field work has started and no wood sawn, it often means that there is so much extra to do cutting firewood before breakfast. See that harness is in good repair, and have all leather dressed with oil. I prefer black harness oil. See that all burrs and thistles are destroyed. Before seeding go over the combine and have all necessary repairs effected. After seeding remove any large stones and stumps. Perhaps gates have got out of repair, or wires tangled and broken. These must be mended without delay. A few wires in the crop paddocks may be broken, or gutters washed out. If this is seen to it will prevent stock getting at the crops. On wet and cold days in the repair shop all classes of repair work can be undertaken—mending chains, swingle-trees, chain hooks, and sharpening crowbars, harrows, and steel shares, &c. To do this efficiently, have a repair notebook and enter all fittings wanted and necessary adjustments. Make a cocky chaff scoop and two or three hen and chicken coops. As spring approaches, paint any wood-work on wagons, hay frames, gates and doors, and any wood that wants protection from rain and sun." Mr. A. Lang thought paint too expensive for gates. He favored coal tar. Mr. Kupke said that for painting gates coal tar and cement mixed together was good, also linseed oil. Charcoal would stop rot in posts; and yellow ochre and coal tar made a green paint. Mr. R. McCallum read a paper entitled "Cheapest Method of Gathering a Crop in this District." (Secretary, Mr. A. McCallum.)

March 27th.—Present: nine members.

Mr. B. Koch read a paper, "Sport on the Farm." Many people hold the opinion that the farm cannot be worked properly if sport is encouraged. Farmers work long hours, but sometimes do not give any encouragement to young people to take part in recreation and sport. Life on the farm is often made a drudgery by working too long at one job. The work becomes dull and monotonous, and tends to make the young people long for the city, where more sport is available. It may be said that some of the wealthiest farmers never thought of playing games but only of work and money, but that does not apply to the present day. The young people that do not join in sport in the present day are missing a most enjoyable phase of social life. It is on the playing ground that they meet the best young people. Not only do we play against them, but we meet others with whom we can discuss farm topics, forget our own ills for the time, and make farm life brighter. All young people should join the Agricultural Bureau; they will gain much useful information. Young men and women who wish to be suc-

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### Eggs for Hatching and Day old Chickens

#### WHITE LEGHORNS.

EGGS.—10/- per setting of 15 Eggs. Incubator lots £2 per 100.

DAY OLD CHICKENS.—15/- per dozen. £5 per 100.

#### BLACK MINORCAS.

EGGS.—12/6 per setting of 15 Eggs. Incubator lots £2 10s. per 100.

DAY OLD CHICKENS.—17/6 per dozen, £6 per 100.

Free on Rail, Salisbury. DELIVERY, July, August, and September.

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C. F. ANDERSON, Poultry Expert.



cessful in life must play sporting games. Sport is a character builder; it teaches us to give and take and play the game. A half a day off between the busy months goes a long way towards making farm life happy. Sport is sometimes overdone, but people that allow this to happen are not the best farmers." (Secretary, Mr. A. McCallum.)

WEPOWIE (Average annual rainfall, 13in. to 14in.).

April 20th.—Present: 10 members.

**ECONOMY ON THE FARM.**—Criticising a paper on this subject, which had been written by Mr. H. Roocke, Mr. W. Gregurke said that increased production was one of the few ways of minimising overhead expenses at the present time, and that travelling was a profitable investment, because knowledge gained often resulted in a large saving of time and expense. Mr. J. F. Burns thought super and cornsacks were the farmers' bug-bears, they had no control over either, and through those channels many a farmer had met his present unfinancial position. Mr. J. Crocker thought the farmer had very little control over the spending of his money because of the fixed prices for necessary goods, such as super, cornsacks, machinery, and high interest rates, there was only a very scanty margin left for the farmer to use at his own free will. The living standard of the average farm household left very little room, if any, for reducing expenses. Mr. Crocker also favored travelling as a very useful side line to effective economy, but at present he thought too many holiday makers favored the city. A trip to another State or to some farming district of our own State or the Territory were ideal places for farmers and farm hands in which to spend a holiday. Mr. T. Orrock stated that economising now, when everything was at its lowest, was very hard to do, but when good seasons prevailed too little care was exercised in keeping down overhead expenses. New machinery was bought when a few repairs to an old machine would have made it workable for a further period of years. Light working of the soil was one way of reducing production costs. Mr. E. Roocke considered that land in many instances was worked when not at all warranted, especially in dry seasons. In practically every instance where fallow had been worked frequently the lowest returns have been received, thus increasing the cost of production, whereas on the other hand if fallowed to a depth of 1½ in. to 2 in. the soil needed very little working to keep it in quite a good state, unless, of course, heavy rains caused it to firm too much or weeds predominated, then working was essential, otherwise if harrowed once or twice it made a very fine seed bed at the minimum of expense, so essential at the present depressed period. (Secretary, Mr. E. Roocke.)

#### *Summary of Meetings, &c.*

| Branch.     | Date of Meeting. | Members Present. | Subject.                    | Secretary.        |
|-------------|------------------|------------------|-----------------------------|-------------------|
| Wilmington. | 17/2/31          | 19               | Address—Mr. E. L. Orchard   | H. Stevens, Terka |
| Wilmington. | 9/3/31           | 18               | Address—Mr. J. O. Hatter    | H. Stevens, Terka |
| Wilmington. | 21/4/31          | 9                | Conference Report . . . . . | H. Stevens, Terka |

### **MIDDLE-NORTH DISTRICT.**

#### **(PETERBOROUGH TO FARRELL'S FLAT.)**

BLYTH (Average annual rainfall, 16.86in.).

October 3rd.—Present: 21 members and visitors.

**THE TEETH OF THE HORSE.**—Mr. A. Webber read the following paper:—"The teeth of the horse are a very important part of his constitution. It is very important to see that the young horse casts his front or milk teeth; if not, they should be extracted, for they not only cause injury to the permanent teeth trying to come through, but if left will 'set in.' A horse at 2½ years old should have his middle teeth, top and bottom permanent, at 3½ years he should have four top and bottom permanent, and at 4½ years the six top and bottom, and in the case of a stallion or gelding he should have two tusks, commonly called bridle teeth. At 4 years the animal starts to shed his molars or grinders, and it is rather a bad time for a horse. The doing up of horses' teeth is not pleasant work, but all horses should have their teeth examined and attended to if necessary. This should be done, say, at 3 years old. Prevention is better than cure, and a little attention at that time may save years of suffering and make the animal much more useful and valuable to his owner. Farmers are inclined to wait until they see a horse slobbering or unable to eat at all, and then they expect the vet to



put the teeth in order and the horse to get fat in a week or two. The cost of having them attended to is very small considering the benefit to the horse and through him to the owner. A large number of the internal troubles of horses are caused through bad teeth. Defective teeth have an important bearing on the health of a horse." Mr. E. Molineux gave a report of the work of the Project Club at the local school. (Secretary, Mr. L. Mugge.)

#### EVERARD EAST.

April 8th.—Present: 10 members.

**PIGS FOR MARKET.**—Mr. A. Higgs read a paper, "Which is the Best Pig to Breed for Market?" He favored the Berkshire or Berkshire Mid-York cross, and said the sow should have a fair allowance of skim milk while rearing the pigs; failing milk, sloppy pollard should be used. When fattening, it was best to feed grain dry, because it made harder meat.

Mr. H. Wilkin also read a paper, "Which is the Best Wheat for Hay?" He favored King's Early, White Tuscan, Bluey, and Waratah, and said horses did not like Nabawa, only eating the heads. Mr. E. Colton said horses would not eat King's Early, and even cows did not seem to like the chaff. Mr. C. Hughes preferred Early Gluyas; it was very heavy and carried a good grain with a green straw. After a good discussion, members agreed that the apparent dislike of the horses for the hay was most likely due to red rust, most wheats being rusty this year. (Secretary, Mr. F. Hughes, Blyth.)

#### MURRAYTOWN.

April 15th.—Present: seven members.

**OTHER MEANS OF MAKING MONEY ON THE FARM BESIDES WHEAT GROWING.**—Mr. B. Starr contributed the following paper:—"Primary producers must find other means of adding to their income and not depend wholly on wheat, for it is more than likely that seasons will be better from now on for at least a few years. I suggest that fodders and grasses such as lucerne, Sudan grass, rye grass, and Subterranean clover and Cape barley be grown to provide more green feed for cows, pigs, and poultry. This will also allow extra green feed for the working horses and save feeding all hay. If this is done and well-bred stock kept, it will be possible to augment the income from wheat and sheep. Further, it will be possible to get a better price for some of the grain by sending it to market on the hoof." (Secretary, Mr. E. Pitman.)

A meeting was held on March 6th. The Hon. Secretary (Mr. E. Pitman) read a paper, "Wool Growing in Australia."

**NARRIDY** (Average annual rainfall, 15.93in.).

Meeting held November 18th. Present: 12 members. Reports of the delegates to the Annual Congress were received and discussed. (Secretary, Mr. H. Cox.)

#### Summary of Meetings, &c.

| Branch.      | Date of Meeting. | Members Present. | Subject.                 | Secretary.       |
|--------------|------------------|------------------|--------------------------|------------------|
| Redhill .... | 28/4/31          | 6                | Question Box .....       | S. Pengilly      |
| Wandearah .  | 7/5/31           | 6                | Programme Arrangements   | J. O'Shaughnessy |
| Caltowie ... | 18/5/31          | 14               | Address—Mr. J. O. Hafter | R. Wilkinson     |

#### LOWER-NORTH DISTRICT.

##### (ADELAIDE TO FARRELL'S FLAT.)

#### LIGHT'S PASS.

March 2nd.—Present: 36 members and visitors.

**SHALLOW CULTIVATION.**—Mr. T. Roenfeldt, in the course of a paper on this subject, first gave a description of the action of moisture in the soil and the function of soil bacteria. The paper then read as follows:—"The system we have adopted for the last 20 years, and the one which has given the best returns in this district, is to fallow in June or early July (weather permitting), the land not to be over cultivated. Ploughing from 2½ in. to 3½ in. in depth (never over 4 in.), which can only be accomplished by cutting a furrow not more than 8 in., much better by cutting 6 in. The land to lay as open and rough as you can get it over the rest of the winter, and then harrowed down



by the end of August. The first cultivation after harrowing should be a thorough spring toothing to the ploughing depth, in order to bring the clods to the surface, and so sift the fine soil to the bottom to form a compacted layer. Early ploughing allows this initial cultivation to take place at a more suitable time; it should at least always be done by the end of September before the advent of hot, dry weather, otherwise the activity of your soil bacteria is checked. Subsequent cultivations should be shallower every time, and done with the object of stirring the mulch soil only, keeping it in a loose condition and weed free. It is in these workings that wheat growers chiefly err. Insufficient attention is given to regulating the implements to work uniformly at the correct depth, particularly approaching seeding time, and not infrequently a loose, open soil is the result at the time. With such a condition root growth is checked, normal growth cannot take place, and being in a weakened condition, the plants are more susceptible to attack by parasitic disease, such as takeall, haydie, &c. Never work the ground when it is too wet, or the mulch will set down very hard, and under no condition work the fallow dry after November. Always run over the fallow immediately after rain that causes a crust to form, even if it is only with heavy stump jump harrows. The general inference is that under our district conditions relatively shallow tillage is more profitable than deep tillage for wheat growing, because in the event of floods or a very wet year the soil will wash away as far as it has been cultivated, and the ground will not become waterlogged and sodden, and all the bacteria checked or destroyed by cold and over-moisture as would happen when too deeply tilled. Over an average number of years my experience has convinced me that shallow tillage is by far the most profitable." Mr. J. Tscharké read a paper on "Deep Ploughing." (Secretary, Mr. C. Verrall.)

March 30th.—Present: 28 members.

MANURIAL EXPERIMENTS WITH GRAPES.—Mr. A. J. Chapman supplied the following report:—*Gypsum Experimental Plots*.—The yields from the various plots for 1931 were as follows:—Plot No. 1: 1 ton of gypsum per acre, 1926, yielded 615lbs. Plot No. 2: Check plot, no manure, 500lbs. Plot No. 3: 1 ton gypsum per acre, 1926, and 3cwts. of super annually, 730lbs. Plot No. 4: Received 3cwts. of super per acre since 1926, yielded 700lbs. From these figures it will be seen that the plots receiving super have shown a considerable improvement over the check plot, sufficient to more than cover the cost of super used; in fact, for the first time since the experiment commenced the supered plot has been almost as profitable as the No. 1, which received gypsum only.

|                                        | Plot<br>No. 1. | Plot<br>No. 2. | Plot<br>No. 3. | Plot<br>No. 4. |
|----------------------------------------|----------------|----------------|----------------|----------------|
|                                        | Lbs.           | Lbs.           | Lbs.           | Lbs.           |
| 1927 . . . . .                         | 710            | 653            | 744            | 668            |
| 1928 . . . . .                         | 463            | 391            | 502            | 454            |
| 1929 . . . . .                         | 828            | 559            | 764            | 554            |
| 1930 . . . . .                         | 446            | 376            | 506            | 470            |
| 1931 . . . . .                         | 615            | 500            | 730            | 700            |
| Total . . . . .                        | 3,062          | 2,479          | 3,246          | 2,846          |
| Means . . . . .                        | 612½           | 495½           | 649½           | 569½           |
|                                        | £ s. d.        | £ s. d.        | £ s. d.        | £ s. d.        |
| Total cost per acre . . . . .          | 1 10 0         | —              | 5 5 0          | 3 15 0         |
| Value of increased yield at £6 per ton | 4 13 8         | —              | 6 3 9          | 2 16 7         |
|                                        |                |                |                | Loss           |
| Profit over cost of manure . . . . .   | 3 3 8          | —              | 0 18 9         | 0 18 5         |

It will thus be seen that the plot which received gypsum only has been easily the most profitable over the five-year period, followed by No. 3, which received super in addition to gypsum; No. 4 has shown a loss of 18s. 5d. over the period. The general appearance of the plots at the present time shows that No. 3 is in much better heart than any of the others, the vines having become much more robust in appearance in the five years. This plot is certainly in a much better condition to bear crops in the future than any of the others. Plot No. 1, gypsum only, is in fairly good condition, but the general appearance of the vines is not so outstanding as two years ago. Super only, No. 4, certainly looks better than the check plot, but the vines have not the same healthy appearance as where gypsum was applied. In spite of the fact that the gypsum only plot was the most profitable, I prefer to use a moderate dressing of super as well as gypsum on this class of soil, as I am convinced that it would be the most profitable eventually."

Mr. F. W. Boehm gave the following paper, "Season's Report on Apricots":—"After last year's good crop and dry season the trees were looking good, so far as buds were concerned, in June and in early July in the Light's Pass district. Later in July and early in August buds were not looking healthy, probably the dry spell in June and early July made the buds move, and when rain came the buds were checked



and caused them to look unhealthy. I sprayed earlier than usual on account of buds not looking so healthy. Towards flowering time buds seemed to have improved a little, especially on young trees, which bloomed well and the setting was good. Old trees did not bloom so well, and the setting was patchy. Trees were pruned in July and finished the first week in August. Favorable weather conditions prevailed during the first half of September, and ploughing was continued right through that month. On October 5th a shower of hailstones passed through the district, but caused only slight damage. Nice rain followed, which benefited the apricots and the gardens generally. Apricots had a healthy and clean appearance, but were uneven in size, and some of the fruit started to drop. Not much rain followed during the next two months, yet the apricots filled out nicely, but only a fair crop was harvested. £6 was offered by the buyers at the factory door—only about half of the production cost. It is to be hoped that the newly formed Fruitgrowers' Association will be able to bring about a better price next year."

**DUCHESS PEARS.**—Mr. C. B. Robin reported as follows:—"Flowering patchy, and weak, with a very light setting. Owing to the light crop the fruit was of good size, notwithstanding the dry season. Shipments of Duchess on a fairly large scale were made to relieve the local market. The last shipment realised satisfactory prices—12s. to 14s. per three-quarter case; half cases 5s. to 7s. each. Final returns not yet to hand, but growers expect to realise 3s. to 5s. per case, if expenses are not too heavy. The Duchess will always prove a risky pear for export, however carefully handled, owing to its early ripening, but at the present time growers have practically no other outlet, and when the crop is normal, if nothing is done, hundreds of thousands of cases will again be left to rot, as was the case last year. Very few pears were sold for canning, and the price paid was only £5 per ton, which is the bare cost of production in a normal year. *Fresh Fruit.*—Owing to the scarcity of apples, pears have been selling at quite a satisfactory price, but, of course, this would not occur in a normal season. There is something radically wrong when factories will not buy our fruit for canning on the grounds that they cannot compete. If the other end of the business was handled properly the demand for our pears would quickly overhaul the supply. Of the late varieties of pears there is a very light crop, only Umlauf and Kieffer being 'on' this season, and, owing to the shortage of apples, a satisfactory price is being realised—from 6s. to 8s. per case. From last year's export returns it seems that in our late pears we have concentrated too much on the Glou Moreau, as the extra 2s. to 3s. in London brought by the better varieties makes all the difference to the profit or loss incurred by the exporter." (Secretary, Mr. C. Verrall.)

## DAIRY CATTLE IMPROVEMENT ACT, 1921.

# SALE OF PUREBRED BULLS

Dairymen are again reminded that on and after July 1st, 1931, no bull will be accepted for sale under the Government Subsidy Conditions unless its dam has qualified under the present butterfat standards. It is suggested, therefore, that persons who desire to sell, under subsidy, bulls which are eligible only under the old standards, should effect the sales at once.

DEPARTMENT OF AGRICULTURE.

MAY 1st, 1931.



## NANTAWARRA (Average annual rainfall, 15.40in.).

February 26th.—Present: six members.

**SIDE LINES.**—Discussing a paper on this subject which was read by Mr. K. Young, Mr. F. Nicholls said that when one had to employ labor to look after a sufficient number of side lines to be worth while, it would not pay, but that over a period of years wheat-growing would prove to be the mainstay. Mr. C. Nicholls was not in favor of side lines to any great extent, but thought everybody should produce enough for their own use. The danger in everybody doing the same thing would cause a less return. In their district wheat was the main object in farming. Mr. E. Hamdorf said side lines were paying better now than at other times, but the expense in getting herds together at present was not warranted, as the income in future would not be assured. Mr. W. Hamdorf said much depended on the size of the farm whether a man could manage side lines successfully. They were an asset, but they must stick to wheat if they had sufficient land. It paid to have side lines on a farm. Mr. N. Robinson said side lines were considered as pocket money years ago, but at present they were very necessary for the use of the household of a farm. The President presented to Mr. A. F. Herbert a Life Member's Certificate of the Agricultural Bureau of South Australia. (Secretary, Mr. N. Robinson.)

April 2nd.—Present: Seven members.

**UNIMPROVED LAND VALUES OF A WHEAT FARM.**—Mr. C. Nicholls read the following paper:—"To arrive at the unimproved value of land it is necessary to ascertain what that land would be worth to a man with money to invest if it was still in its natural state. There are many things that go to control that value. It is necessary to take into consideration the cost of clearing and general costs of working, and the producing capacity and advantages in social services, such as schools, railways, water reticulation, and postal communications. For the purpose of arriving at the unimproved value of land on the average farm in this district, I am taking a holding of 1,000 acres and assuming that it was originally covered with fairly heavy mallee timber. Before such a farm could be brought to its maximum earning capacity a big outlay of capital is necessary, and would be required to be spent on the following items:—Clearing 1,000 acres at £3 per acre, £3,000. Buildings—House and man's room, £750; implement shed, £80; stables, chaff shed, and engine room, £120; barn and shearing shed, £60; smithy and motor shed, £30—£1,040. 900 chains of fencing, with necessary gates, troughing, and sheep yards, £900; Working plant and stock—Implements, £995; 15 horses at £25 per head, £375; 300 sheep at 13s. 4d. per head, £200—£1,570. Total capital, £6,510. Having spent approximately £6 10s. per acre on the farm, it should be capable of growing 20bush. of wheat per acre on 350 acres of well-worked fallow, besides growing sufficient hay and feed to carry the necessary stock. The only basis on which it is possible to work out the unimproved value is to find out what annual profit can be got from such a farm. The annual expenditure is as follows:—6 per cent. interest on capital outlay, £390. 2 per cent. depreciation on buildings and fences, £39. 5 per cent. depreciation on implements and harness, £40. 10 per cent. depreciation on horses, £38 10s. Council and water rates, £35. 23 tons super, £120. 2,180 cornsacks (at 10s. dozen), £90. Twine, oil, grease, fillings, &c., £30. Travelling expenses, £5; telephone, £5; and insurance, £15—£25. General repairs, £20. Wages for self and man, £300. Total annual expenditure, £1,127 10s. Annual receipts—2,180 bags of wheat at 3s. 6d. per bushel, £1,144 10s. Wool from 300 sheep (7s. per head), £105. New profit from sale 200 fat sheep (4s. per head), £40. Total annual receipts, £1,289 10s. From this amount we deduct £1,127 10s. for expenses, leaving profit of £162. By capitalising this amount with interest at 6 per cent. we find that the total unimproved value of the 1,000 acres would be £2,700, or £2 14s. per acre. Discussion.—Members considered it a very fair statement for a normal year, although a 20bush. average seemed high at present, considering the last few years. It was an opportune paper, considering the controversy on the subject at present. The profit was considered small, taking into account the amount of capital involved. (Secretary, Mr. N. Robinson.)

## RIVERTON (Average annual rainfall, 20.81in.).

March 9th.—Present: nine members.

**CROP COMPETITIONS.**—Mr. J. E. Kelly read a paper on "Crop Competitions," in which he suggested that there should be three sections: (1) for farms of from 300 to 500 acres on the basis of an entry of 25 acres in one paddock and one variety of wheat; (2) for farms of from 500 to 600 acres on the basis of an entry of 50 acres in one paddock and of one variety; and (3) for farms of 900 acres upwards on the basis of 100 acres in one paddock and of one variety. By this arrangement he considered that the competitors would be on the same footing in each section, and that it would stimulate interest among the smaller growers. He thought that the competitions were mainly won by farmers with larger holdings, and other competitors could not do themselves justice in a competition when they were obliged to enter against the bigger landowners. Taking, also, the varying nature of soils into consideration, it was impossible for a farmer whose



farm consisted of from 70 to 80 per cent. limestone or loamy soil to compete with the farmer whose land was of heavy black or Bay of Biscay land. He claimed that the farmer who could produce an average of 20bush. to the acre on limestone country was growing a far better crop, relatively, than the farmer who grew 30bush. to 35bush. on black or Bay of Biscay soil. Both crops were judged on the same footing, and no allowance was given for the class of country. He realised, however, that this point would be difficult to overcome, but there was, nevertheless, an inequality. He thought that the method of awarding points for yield should be adjusted. It was often difficult on account of various circumstances for anyone to give an accurate estimation of yields, and he referred to cases where estimation of yields were very different to actual yields. He maintained that the winning crop in a competition should be the crop which returned the greatest profit per acre. In discussing the paper, Mr. F. W. Coleman said that a small farmer would have a better crop—by working his land more—than a farmer on a larger holding. Mr. J. McInerney (Chairman of the Midlands Competitions) said that land worked for three years previous to cropping would give the best yield. The weighing of yields would not work advantageously, and it was necessary, therefore, to keep to the system of awarding points on apparent yield. He was pleased that Mr. Coleman had won the three-year Competition on the average number of points and that the trophy came so close to the Riverton district. (Secretary, Mr. O. Longbottom.)

#### ROSEDALE.

March 3rd.—Present: 14 members.

**CALF REARING.**—Mr. G. Sincok, in reading a paper on this subject, first emphasised the importance of obtaining the services of the best bull that finances would permit. He also suggested that if funds would not allow the farmer to purchase a bull for the sole use of his own herd, he should discuss the matter with a neighbor and endeavor to buy a sire on a co-operative basis. Prior to calving, the cow should be kept in good condition to maintain bodily health, produce milk, and develop the calf. As calving approaches it will be noticed that the cow's milk supply falls away. There is nothing to be gained by trying to keep her in full profit; let her go off a little at a time until seven and a half months, when there will only be about seven weeks to wait for her

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to freshen. If the cow is not on good feed, see that she is stall fed with bran, crushed oats, linseed, and good, green chaff. It is necessary when she is finishing off the calf that she does not have to go hungry. I feed about one week after the cow dries off until she comes in; she will then be in good order for the year's work, and produce a calf that will be a pleasure to rear. It is not advisable to heavily feed a fat cow on oats and linseed, but she should have plenty of chaff and grass. When the calf is born, it should have the first milk from the mother for the first three or four milkings, after which it can be taken away from the mother. Keep the calf out of sight of the mother and in 12 hours it should take its first meal from the bucket. Take about four pints of warm milk from the cow, get the calf between your legs, place the left hand around the mouth, with two fingers above the tongue, with the bucket underneath the head of the calf, and then lift up the milk with the palm of the right hand, making sure that the milk is going down the throat of the calf. After lifting up two or three handfuls, the calf will taste the milk and start sucking the finger. Coax the calf's head down with the left hand. Having fed the calf the first time, do not be too anxious to make it drink a lot. After a few days it will drink about 1 gall. at each meal, which should consist of two pints of fresh and six pints of separated milk. At three weeks of age the calf will require something more than milk, and green hay will be found very suitable. Failing this, long chaff, a little bran, and some linseed can be fed. This will carry the calf on for about three or four months, when it can be put into a small paddock. If grass is not available, see that it is given plenty of hay. The milk can be reduced and a little water added. Do not change over too quickly from one form of feeding to another. Keep the heifer calves by themselves and they will be more easily controlled. At about 12 to 15 months old they can be mated. After service, see that the heifers are kept in good condition. At six months of age they should be brought into the bails and given a small feed of chaff and bran once a day for a month and then twice a day. This will be time and feed well spent; learn them to enter the bails and run your hands over them. Always speak to them and it will save much pushing and pulling when they come into milk. It is advisable to accustom the heifers to leg roping. This is very important, for one never knows when sore teats or a tender udder will develop. Sometimes it is difficult to milk a heifer full hand. Try and milk her with a squeeze, even if it is only possible to use the first finger and thumb. When milking a heifer, it is a good plan to squeeze the milk down into the teat and rub the point of the teat with the knuckle of the thumb or finger. Never on any account use the nail or the teat may be injured. (Secretary, Mr. H. Muegge.)

#### UPPER WAKEFIELD.

April 2nd.—Present: 11 members.

**CARE OF THE LAMBING FLOCK.**—Mr. J. Cleary read the following paper:—"As lambing time approaches, it means a good deal of work for farmers, who are generally busy seeding. Foxes are a great trouble, especially among early lambs. It is a good plan to inspect the flock during the day. Ewes often 'get down' during lambing, and assistance can be given to those which cannot deliver their lambs. Often after the lamb is taken from the ewe it appears to be dead, but in a great many cases, with a little trouble, the youngster will recover, and if a little drop of milk is milked from the ewe into the lamb's mouth it will very often recover, and the lamb can be put on the teat whilst the ewe is lying down. When this is done it is well to make sure, before lifting the ewe, to see that she intends to take to the lamb. If not, tether the ewe with a piece of binder cord for a few hours, until the lamb is strong and will follow the ewe. In any case, the ewe generally breaks loose and both walk quietly away. **Marking and Tailing.**—This is very important work, and great care should be taken. Do not tail straight after yarding; lambs are generally overheated and often are lost through loss of blood. Every lad on a farm should be taught how to hold a lamb for castrating. A very important point when removing the testicles from a lamb is not to pull too hard. Pull gently, and take the purse between the thumb and the forefinger, pressing on the stomach at the same time. Injury to the lining of the stomach causes rupture. When letting the lamb go after the operation, bend over the rail and open both hands at the same time, and the lamb will always land on its feet. On no account should a lamb be put down by force. It often happens that one testicle only can be found. If the hind legs of the lamb are released and the stomach pressed, it will generally come down. If it cannot be found it is customary to only 'dock' the tail, so that this lamb can be recognised later." A good discussion followed. (Secretary, Mr. C. F. Neumann.)

#### WIRILLA.

Mr. W. Jones presided over an attendance of 24 members and several representatives of the local Women's Branch, making a total of 50 persons present at the meeting of November 6th, which was held at the residence of Mr. W. Blatchford. Mr. J. Jones gave an instructive address dealing with his experiences on a recent tour of the world. (Secretary, Mr. H. Schunke, Manoor.)



**ERRATUM.—SADDLEWORTH.**

On page 1092 of the May issue the following was omitted from a paper read by Mr. L. Giles:—After the word "breed," line 31, "Their original home is England, and perhaps that is another reason for their popularity. The Friesian is a very old breed; we find it mentioned in history 400 years B.C."

*Summary of Meetings, &c.*

| Branch.      | Date of Meeting. | Members Present. | Subject.                                          | Secretary.                |
|--------------|------------------|------------------|---------------------------------------------------|---------------------------|
| Lyndoch ...  | 28/4/31          | 12               | Discussion .....                                  | J. Hammatt, Williams-town |
| Riverton.... | 11/5/31          | 11               | Paper—"Wool Publicity Campaign"                   | O. Longbottom             |
| Greenock ... | 4/5/31           | 31               | Paper—Mr. B. Boehm;<br>Address—Mr. W. C. Johnston | H. Wilksch                |
| Wasleys .... | 14/5/31          | 12               | Paper—Mr. G. Buckley                              | C. Currie                 |
| Penwortham   | 7/5/31           | 15               | Pruning Conference<br>Report                      | A. Jenner                 |
| Brinkworth . | 27/4/31          | 19               | Paper—Mr. C. Ottens....                           | H. Ottens                 |
| Brinkworth . | 13/5/31          | 11               | Cinema Lecture—Vacuum Oil Co.                     | H. Ottens                 |

**YORKE PENINSULA DISTRICT.****(TO BUTE.)****BOOR'S PLAINS.**

April 2nd.—Present: 12 members.

**CARE AND MANAGEMENT OF HORSES.**—Mr. G. Rodda contributed the following paper:—  
 "When horses are brought in from stubble feed, have a good clean stable ready for them. Bring the horses in and feed them once a day for a week. They become accustomed to the feed, which will save trouble with colic and scouring, and put them in better order for working. Trim the hoofs, and see to the manes and tails. For feeding, I prefer oaten hay chaff. Regular feeding is very important. Give four feeds a day, as near as possible to the same time every day. The manger should be cleaned out at midnight, then the team will have a good rest, and be ready for breakfast. Always feed enough, but be sure the animals clean up what is given them. Horses should have 1½ hours to feed in the morning; three-quarters of an hour at midday is plenty in winter when the days are short. Always aim at keeping the horses in good condition; it takes less feed to keep them, and they do their work much easier. I prefer working two yokes a day. All horses should be groomed every morning with a currycomb. A man who has a 12-horse team, and gives them 1½ hours in the morning to feed, has plenty of time to have breakfast, and do anything there is to be done regarding his team. Have all harness in good order—winkers, couplings, and reins. See that winkers have good bits and rings; if worn throw them away, it is cheapest in the end. Collars should be cleaned every morning before being put on the horse. A well-fitted, clean collar, put on a clean shoulder, will minimise sore shoulder troubles. Never pinch a collar with the hames, it will cause a sore on the top of the neck. Always keep the mane from under the collar. When the team is started off afresh, work short yokes for a few days until they get settled down. Do not work horses after sundown; the sweat does not dry off overnight; half an hour after sundown takes as much out of horses as two hours in the morning. In driving the team, do not push them; they will go their own pace, do just as much work, and do better than the team that is driven. Mares that are used for breeding should be given a little extra care, both in feed and work. They should be kept out of any heavy pulling; ordinary work will not hurt them, if kept in good condition. If one has enough horses to do the work it is better to spell the mare whilst suckling the foal. Keep the mares in condition and they will feed the foals much better. Wean the foal at six months old and work the mare lightly. When the foal is weaned, feed it and keep it in good condition. At three years old the colt should be broken in. This is best done just before harvest. Work half-days for a start until the colt becomes hardened. For breaking in young horses, I prefer a round yard to catch them in. Get a light stick, 5ft. or 6ft. long, rub them



over with it for a while, and in less than 20 minutes a rope and headstall can be put on. Do not put the rope around the neck; put it around the back between the front legs and through the headstall. Tied this way the colt will give in to the rope much quicker. After being tied up for a few days, the colt will lead in a few minutes, and be then ready for the team. Put him behind a quiet leader with a neck rope on and there will seldom be any more trouble." (Secretary, Mr. S. Chynoweth.)

#### PETERSVILLE.

March 3rd.—Present: Nine members.

Harvest reports were given by several members. Mr. C. J. Harmer in a paper, "Care of Farm Tractors," advised every user to see that his machine was always ready for use whenever it was required. After the tractor had been overhauled and was quite ready for the paddock, the fuel tank should be filled with clean fuel. He always liked to have a clear flow of fuel; if not, it would be often necessary to pull the carburettor down, which meant delay. Care should be taken to strain all fuel. Lubrication was an important factor. Most tractors had a simple gauge of some sort. The oil should be always kept up to the level the maker intended it to be. Further, one should be certain that the engine oil was not half diluted with kerosene through neglecting to change the old worn-out oil, as was often the case. *Greasing.*—He had used both the grease gun and cup compression methods of greasing. He preferred the former, on account of the great pressure that could be used. Once a day he found was often enough for greasing, though the cups required frequent screwing up. There was not much required in the lubrication of the gear case, as it was automatic. A modern tractor should last up to eight years. A tractor was never worn out entirely, because parts could always be renewed, but after about eight years it became too costly to be profitable. In maintaining the life of a tractor the user was a much more important factor than the owner. Some drivers never thought of lightening the load by propping up one furrow. Anyone who was used to engines could tell when a tractor was overloaded. The writer liked to hear the engine exhaust bark out sharply when the tractor took up the load. It showed that the engine was not overloaded. A tractor should never be overloaded; firstly, because the engine would run at less than its normal speed, with the result that the governor would open up the throttle and the kerosene would be sucked in, but would not be properly ignited. Thus the unused kerosene was forced past the pistons into the crank case, and diluted the oil, with very bad results to the smooth surfaces of the cylinder walls. A good test to make sure that a tractor was not overloaded was to place the lever of the implement into the soil for about four notches further than the setting that it was intended to use. If the tractor could pull that all right it would be safe enough at the original setting. A 15/30 tractor should not be given a load heavier than a 12-horse team could manage. Twice a year ought to be often enough to do valve grinding and de-carbonising. An old valve should not be kept working too long, since it was an inexpensive item. If the engine started to use too much oil, it might be due to the piston rings being badly worn. To get the best results the carburettor should be frequently cleaned and re-adjusted. The writer's way of adjusting a carburettor was to retard the spark, "rev. up" the engine, and screw up the jet until the engine started to "spit" or to labor. He then opened up the jet until the engine ran free. He found that that adjustment would work well at all times and under any load. Too lean a mixture resulted in a hot engine, and also used a good deal of oil, and thus one would not save by cutting down the mixture too far. A little oil added to the kerosene would assist in lubricating certain parts that could not be oiled otherwise. One should not abuse a tractor by speeding up the engine above the speed recommended by the maker. A high-speed engine would give more power, but also a repair bill. However, he did not like to hear an engine laboring through being driven too slowly or under too heavy a load. The magneto should not be tampered with by anyone except a careful or experienced man. Slipping the clutch was very detrimental. It was often done where the load was too great. It certainly let the engine gain speed, but it caused intensive friction, which would burn or score the clutch plates. If persisted in the clutch would not hold the power of the engine, and new plates would have to be inserted. The transmission and gear case should always be kept full of heavy oil. If that was done there would not be much need to worry. However, under heavy loads and sudden strain the bearings would be sure to need attention sooner or later. It was advisable to have the transmission inspected every two years during the first four years, and after that annually. There was always plenty of time to have such work done during slack months. All nuts on the spider bolts should be kept tight. They held the differential in position, and if allowed to become loose the back-lash would be too great for them, and a breakage would be certain. (Secretary, Mr. A. G. A. Dutschke.)



**WEAVERS (Average annual rainfall, 16.89in.).**

The monthly meeting held on September 8th was attended by 19 members and two visitors. Mr. E. J. Algie read a paper, "Sheep and Wool." He said that when stocking a farm with sheep the first point for consideration would have reference to the number that could be kept to the best advantage on the area available. There was greater wisdom in understocking than in overstocking. Sheep were kept not only to show a direct profit of their own, but to help in cropping, to enrich the land, to keep down weeds, and to turn to advantage odds and ends that would otherwise be lost. Even where general conditions were best known, no one was as yet in a position to state definitely the number of sheep to a given area that farms were capable of carrying to advantage. He was of the opinion that the number was much in excess of what was generally believed to be the case. The farmer who wished to combine sheep with his cropping must not limit their number to what he deemed to be the carrying capacity of his available grazing paddocks at the worst time of the year. In other words, he must always hold himself in readiness to feed his sheep, should occasion arise, by such means as sowing Cape barley on hay stubbles or by conserving cocky chaff. He questioned whether barley was made use of sufficiently on light cultivation for grazing purposes. On some farms more sheep were kept than ought to be. Where such overstocking was carried on results were generally very unsatisfactory, because not only were sheep kept in anything but good condition, but at shearing time results of the clip were disappointing. The number of sheep that could be carried on a given area had always been a difficult question. Before fertilisers were introduced the carrying capacity might have been more easily defined, since the season was practically the only thing to be taken into consideration. Since the use of fertilisers, the number of sheep had increased from time to time. The answer to the question, "What is the happy medium?" must be left to the farmer to work out for himself. If he went slowly and felt his way, the problem would gradually solve itself. For lamb raising, he considered the Merino ewe mated with the Dorset Horn ram would produce a good lamb for market, but it was essential to ring fence the whole of the property with pig netting at least 4ft. high. The light fleeced Merino-Dorset Horn ewes were excellent mothers and probably reared better lambs than any other sheep. Possibly when they became more experienced with sheep and had their farms subdivided into a greater number of paddocks, and in the light of the fact that crossbred ewes were better mothers than Merinos, and, if bred on the farm, more docile than bought sheep, the practice of

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breeding their own ewes might become more general with farmers. Years ago it was common practice not to breed from ewes until they were four-tooth or over two years old. He still tried to work on those lines, because he considered that the young ewe needed much more attention during lambing than the older ewe. Frequent reference had been made to the necessity for the sheep being well fed, but it was not less important that they should be supplied with plenty of good water. Of late years the blowfly had become a serious pest to the sheepfarmer, although if the sheep were crutched it would help to overcome the trouble. With the aid of a good dog he found it easier to detect a sheep that was blown out in the paddock than by yarding them. (Secretary, Mr. H. Cornish, Stansbury.)

March 9th.—Present: 11 members.

REVIEW OF THE 1930 GRAIN HARVEST.—Mr. J. Bridges read the following paper:—*Barley.*—As the market for this grain was very dull, only the very best was selected by maltsters as suitable for their requirements. The standard fixed for this grain, therefore, meant that very few farmers had a No. 1 line. I submitted over 50 samples of barley, and out of this number only three were classed as being No. 1. Most of the samples were fairly even and were classed No. 3, or feed barley. Harvesting of this grain is not all that could be desired, and farmers are urged to take more care and prevent the skinning of the barley as much as possible. Skinning good barley is not only spoiling the sample, but has the effect of spoiling the sale of the grain. An improvement in the harvesting generally would be of advantage to farmers. *Wheat.*—Samples of this grain were very disappointing, being from very good to only fair. The fact that the standard for this grain was fixed at 60lbs. shows that the quality throughout this State was only fair, some wheat received was very good and free from smut, &c. A few of the best varieties noticed were Nabawa, Marshall's, and odd lots of the numerous varieties now being sown in this district. Gluford and Gluyas were the most prominent of the affected wheats. With few exceptions, all wheat received contained a proportion of barley, a great deal of chaff, and heads of wheat poorly thrashed. Very little smut was noticed. Greater care should be taken in reaping, and a considerable saving in bags could be effected. Quite a lot of good wheat was received, but too much chaff was in the bags, and the weight of this wheat would vary from 160lbs. to 190lbs. in the bag. If only from an economical viewpoint, every bag of wheat shipped away should contain nothing less than 190lbs. Greater attention to the filling of the bag from the harvester means more wheat in the bag. As the return in cash to the farmer is fixed by the value received overseas, it is apparent that greater care should be taken, and every farmer should see that every bag of wheat and barley is marketed in quality as well as quantity. Weather conditions have not been favorable to cereal growers during the past season, and a return to normal conditions, both in weather and prices for grain, would be most acceptable to everyone." (Secretary, Mr. H. Cornish, Stansbury.)

#### Summary of Meetings, &c.

| Branch.      | Date of Meeting. | Members Present. | Subject.                | Secretary.            |
|--------------|------------------|------------------|-------------------------|-----------------------|
| Kilkerran .. | 5/5/31           | 8                | Discussion .....        | H. Schrapel           |
| Weavers ...  | 11/5/31          | 11               | Conference Report ..... | H. Cornish, Stansbury |

#### WESTERN DISTRICT.

CLEVE (Average annual rainfall, 14.61in.).

April 9th.

BLACKSMITH'S SHOP ON THE FARM.—The following paper was contributed by Mr. T. Slater:—"There should be a blacksmith's shop on every farm, for, with a little experience, every man can soon do the most, if not all, of the small jobs necessary on the farm. The building should be erected at some distance from other buildings, to minimise the danger of fire. The shop should be designed to admit plenty of light to enable one to do the work properly. Good light is necessary when tempering steel, such as picks, crowbars, chisels, &c. With a small bellows or a blower one can get a fire strong enough to do the most essential work. I favor the forge with what is generally known as the 'fire pot.' This will enable one to have the fire well in the centre of the forge and give room for shaping and bending iron necessary for some jobs. Most of the blowers are supplied with the 'fire pot,' and with the top of an old



200-gall. tank with a stand, or leg bolted to each corner, one can rig up a good forge. The anvil should be at least about 1½ cwt., vice, drilling machine, taps and dies ranging from about ½ in. to at least 1 in., two or three hammers of different sizes, tongs for handling different sizes of iron, a couple of good cold chisels, and a set of spanners. A good anvil cutter can be made from an old three-cornered file, if tempered down to prevent it from breaking. At the present time coal is an expensive item, but if one can obtain good charcoal, a lot of work can be done with that, such as the sharpening of tools and shares, bending and shaping iron, in fact, most work where welding is not necessary. Welding at first may seem difficult, but with a little experience the farmer would become quite an adept at it. A clean fire and the correct heat are the main factors. Sea sand makes a good flux for welding, it helps to keep the iron clean, and goes a long way towards preventing it from burning. On wet days or in slack times the farmer can do a good deal of work in the shop, such as repairing chains, making hooks, eyebolts, sharpening picks, crowbars, drawing out shares, making a supply of split-links, which are always handy in the paddock should a chain break. A couple of spare hooks and eyebolts are also always handy in the tool-box of any implement. There is a lot of work that can be done if there is a smithy on the farm, and it will save a great deal of time and expense that would otherwise be necessary if the job has to be taken to a township, which may be miles away. Although it may be expensive to set up a small smithy, counting time and expense, the blacksmith shop will not be long in paying for itself." (Secretary, Mr. H. Matthews.)

#### ELBOW HILL (Average annual rainfall, 11in. to 12in.).

March 3rd.—Present: 10 members.

**PORK AND BACON INDUSTRIES.**—Mr. J. Rehn spoke on the possibilities of the pork and bacon industries and fat lamb raising in this district. With wheat and wool at their present low prices, other means of making money should be sought after. In England there was an unlimited market for pork and bacon of the right type. The pigs he favored were the large white Yorkshire and the Tamworth-Berkshire, which did not produce fat more than 1 in. thick from the shoulders back. There was a good supply of second-class wheat and barley about, which, if not marketable, could be fed to pigs. The biggest difficulty was getting to market at the right time. Mr. S. Wake said little could be done without better organisation. There was very little difficulty raising and marketing pigs years ago. Mr. G. Payne said the difficulty could be overcome by writing to the Government Produce Department. There should be money in pig raising. Eggs were bought from farmers around Cowell within ½d. of Adelaide prices by the Farmers' Union. Perhaps the same could be done with pigs. Mr. Wills said if farmers had spare time they could have side lines. Every penny made now is new money to help the farmer to remain solvent. Mr. W. Cooper believed in side lines or mixed farming. They were a good help now that wheat and wool were so low in value. (Secretary, Mr. W. Cooper.)

#### CUMMINS (Average annual rainfall, 17.77in.).

March 13th.—Present: nine members.

Mr. R. Olsson submitted an extract on the subject "Lowering Production Costs." A good discussion ensued. **Depth of Ploughing.**—Mr. M. Palm asked for opinion of members on this matter. Mr. H. Smith said it depended on the type of land and the district. Mr. H. Roberts said experience led him to favor fairly shallow ploughing, the result being quite as good and less expensive. His land was mostly of fairly heavy type to work. Mr. E. Fitzgerald favored good solid ploughing for new land, and about 2½ in. deep for old land. He said disc implements had done good work for him; they were light in draught and knocked the shoots about. He favored mouldboard ploughs where they could be worked. Mr. F. Jericho favored the share plough where it could possibly be worked. Messrs. Palm Bros. only used disc implements when shoots and rubbish made it necessary. Members were agreed that deep ploughing was not necessary in this district on old land, 2½ in. being sufficient, but new land should be ploughed early to a depth of about 4 in. to break up roots and runners in the soil. **Rate of Manuring and Seeding.**—Members seemed of opinion that tests had demonstrated that 1 cwt. was necessary. Considerable difference of opinion existed on this subject. Some members advocated 40 lb. to 50 lb. graded seed for best results; others favored 70 lb. to 80 lb. per acre. The Secretary promised to carry out an experiment with the object of recording the result of 45 lb. per acre and 75 lb. per acre. Messrs. Palm Bros. promised to conduct a similar test. (Secretary, Mr. H. Roberts.)

#### KOPPIO (Average annual rainfall, 22.40in.).

March 10th.—Present: Seven members and three visitors.

**SUPER WITH CEREALS FOR GREEN FEED.**—Under the title "Does it Pay to Sow Super with Cereals for Green Feed," Mr. R. Schultze read the following paper:—"In 1929 I sowed 8 acres with rye and oats at the rate of about 1½ bush. and 200 lbs. of super to



the acre. This pasture was stocked in August with two horses, six head of cattle, and aged ewes. All stock when put in were in poor condition; in November they were all turned out, but after a few hours all returned and kept on picking off the 8 acres which appeared to be very scarce of feed. All of these animals were in good condition. One ewe weighed 62lbs. when dressed. During pasturing most of the ewes lambled, and the lambs at shearing time—12 months later—were much larger and stronger than other lambs which had a large run of grass and herbage which appeared to be much better as far as quantity goes, but had not been supered. In 1930  $4\frac{1}{2}$  acres were sown in addition to last season's plot. Some of the Subterranean clover had been topdressed. Rain came late, and as a consequence, feed was late. In August 200 sheep cleared out the 8 acres, of which there are about 2 acres of Subterranean clover. In September all stock were shifted, except nine ewes, six head of cattle, and 10 horses. The horses were given a feed of chaff twice a day for a while. When the chaff was all gone they depended entirely on the 12 acres, and results are equal to last year so far as the condition of the stock is concerned." (Secretary, Mr. M. Gardner.)

#### KYANCUTTA, April 22nd.

Mr. R. Bedford gave an interesting address, "How to Improve Farming Conditions Generally to Cope with Low Price for Wheat." A Question Box was also on the agenda, and many questions of interest were asked. It was asked if pig raising could be made a profitable sideline on the farm, and it was decided that such would not be so unless producers could be assured of a market at Port Lincoln, when under such circumstances it could be made profitable. In a question regarding poultry, it was decided that the Utility Black Orpington was the best breed for the farm; it was a good layer and table bird and did not fly on to haystacks or do much damage. It was agreed that if a little time was spent on the homestead garden, enough fruit and vegetables could be grown for one's own requirements. As to the best type of ram to mate with Merino ewes for raising lambs for freezers, the Romney Marsh was spoken of favorably. It was decided that the share plough was the best implement with which to plough the soils of this district. The disc implements met with strong disapproval on account of the land having a tendency to drift. It was agreed that it did not pay to crop land more than three times in succession with wheat in this district, and preferably the third crop should be oats. (Secretary, Mr. D. Fitzgerald.)

#### LAURA BAY.

December 9th.—Present: 12 members.

**AFFORESTATION.**—Under the title "The Advisability of Leaving Timber Standing on the Farm," Mr. W. Bowen read the following paper:—"There is a clause in each farming lease to the effect that it is necessary to leave five acres of standing timber in every 100, but it is left to the discretion of each leaseholder as to where it shall be left. I do not agree with the suggestion that each leaseholder be compelled to leave a strip of timber two chains or more in width all round the boundary. This may be advisable in some cases—where the soil is of a light, sandy nature, which drifts easily—but on such holdings more than this is needed. No paddock should be more than 150 acres, and a break left around each. To those who have land of the nature first mentioned and have still most of their timber standing, I would say 'leave all the breaks you can,' but on land that does not readily drift, leave a fair size patch for firewood, and also smaller patches and odd shady trees in every paddock for shelter for stock. It is not much bother to work around these small patches and odd trees, and one is well repaid for the trouble by knowing that the stock can shelter from the hot sun or cold winds without travelling very far. Were it not for the expense, it would pay to fence both sides of breaks on sandy soils, because where the stock have free access to these breaks, the undergrowth is soon killed and the mallee and other trees soon die out. Further, when the undergrowth is destroyed the wind break loses half its value, unless the break is several chains in width, and too much of that sort of thing means that one is paying away a lot of rent, rates, and taxes for land that grows no feed. If a break of two chains is left around the farm, it will probably mean that you have three chains that are profitable from a grazing or cereal growing point of view. One seldom sees any vegetation within one chain of the break. However, the matter is best left to each individual farmer. He should best know the peculiarities of the soil on his own farm. Sometimes it may happen that a farmer has perhaps a strip of land of a drift nature, while the rest of his farm does not drift. This, of course, would need breaks. So far as this district is concerned, it is too late to worry much over the matter, the majority of blocks having been cleared of most timber." (Secretary, Mr. W. Edson, Ceduna.)



MANGALO (Average annual rainfall, 14in. to 15in.).

April 13th.—Present: 19 members.

**DESTRUCTION OF VERMIN.**—"Of first importance so far as farm pests are concerned is the rabbit," said Mr. O. Hanneman in a paper on the above subject. "If starting on an holding overrun with rabbits, the best way to reduce the number, and by far the quickest, is the poison-cart. This method should be followed up immediately by the complete destruction of all burrows or any other harbors that may exist, then if there is any sign of stray rabbits about, set traps. It will be rather a slow process, but time well spent, for if you do not persevere you will have the same work to do all over again. The best method of destroying foxes is to make a trail by dragging the paunch of a sheep and lay strychnine baits. *Mice.*—These pests give quite a lot of trouble about the house, barn, and hay stacks, and to fence them out is a big undertaking. They can be fairly easily destroyed with poison. Take a small quantity of the best fat, mix a little strychnine into it, place a little of it on pieces of board or wood, and set it out where the mice are doing damage. They will take the baits amongst wheat or flour, but it must be fresh. Do not leave the baits out over the first night, and if there is any danger of any other form of animal life getting it, gather it up and burn it." (Secretary, Mr. C. Hannemann.)

#### PALABIE.

April 3rd.—Present: 12 members.

**PREPARATIONS FOR SEEDING.**—Mr. E. Rashleigh read the following paper:—"In preparation for seeding, fallowing is undoubtedly the correct method of farming. Unfortunately, we have been unable to get the ground cleared so as to have fallow, but we should aim to have some fallowed land as soon as possible. For light soils, the best implements are a skim plough and harrows. A cultivator is a very useful implement for working the land just before drilling in the seed; it loosens the soil to a greater depth than the harrows. In working light soils I favor ploughing to a depth of 1½ins. to 2ins., and then using the harrows as much as possible when the weather is suitable. Fallowing in February and March gives one more time to attend to the fallow. It receives all the winter rains, and as soon as seeding is finished a start can be made to work back the fallow. See that seeding implements are in good condition. Take a note of any spare parts needed at the finish of seeding and get them on hand, and then in spare time the machines can be made ready. 'A stitch in time saves nine' especially

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applies to farmers; a spare part got in early may save a week's waiting when you should be hard at seeding. If seed is to be dry-pickled, get it done early. Pickling with bluestone can be done a fortnight ahead so as to give the grain a chance to dry." Mr. W. H. Brownrigg (District Agricultural Instructor) addressed members on "The Value of Side Lines." (Secretary, Mr. E. Rockleigh, Wudinna.)

PYGERY.

March 31st.—Present: 22 members.

HORSES V. TRACTOR.—This meeting was conducted by the junior members of the Branch, Mr. Humphries being elected Chairman and Mr. J. Edmonds Secretary. Mr. D. Heath read the following paper:—"It is easier to start farming with horses than with a tractor, because a tractor is more expensive to buy than a good team of horses, and there is at least five years more life in the horse team than the tractor. A horse farmer can build up his team by breeding two or three foals every year, and after paying the expense of a good sire, there is no more cost until the breaking-in of the horse, and then £3 will buy the necessary harness, which if carefully looked after should last more than the life of the horse. The horse has helped to buy most of the tractors in this district. If one horse becomes ill, it is quite possible to carry on the job with one less, but if a part of the tractor is broken in the middle of seeding or harvest the tractor would be idle for perhaps a week waiting for the part to be replaced. When harvesting a crop with tractor and harvester, it requires two men to operate, but one man can drive a team of horses and a harvester, and there is no danger of fire with horses. The money expended on the purchase of a tractor and fuel is sent out of the country, but horses and harness are products of Australia." (Secretary, Mr. A. Day.)

ROBERTS AND VERRAN.

February 4th.—Present: 14 members.

MIXED FARMING.—Mr. J. Pahl read the following paper:—"Sheep and their products are regarded as the chief asset in mixed farming. I favor the Merino for wool and lambs, and consider sheep the chief side line. On every farm cows are to be found, generally keeping the house in dairy produce, with a little surplus. I do not think our market warrants the expense of keeping a large herd. For general purposes I favor the Jersey or Shorthorn. In conjunction with cows, pigs can be successfully carried. Given plenty of milk, pigs thrive well; and as oats or barley have to be grown for rotation cropping, these can be fed to pigs, and will in this way return market value. The Tamworth-Berkshire cross is ideal for bacon and early maturity. Fowls also play an important part in farming, and if proper houses and yards are provided, they will prove a most profitable side line. Besides producing eggs, birds could be grown for table use. One hundred fowls kept properly and fed regularly will be found sufficient for most farms. Black Orpingtons and White Leghorns are good layers, and when crossed make good table birds. Last, but not least, is the farm garden, this plays a very important part in reducing household expenses. Almost every variety of vegetable can be grown, provided plenty of water is available. The garden should be protected by a brush fence against prevailing winds. Plenty of manure is essential for success." (Secretary, Mr. C. Masters, Verran.)

March 4th.—Present: Eight members.

FARM MACHINERY.—The following paper was contributed by Mr. S. Barber:—"With wheat prices at such a low level one needs to consider well which implements will serve best before making a purchase. For working the ground for seeding, I prefer a cultivator or skim plough where it is practicable to use them, because not only do they make a better job of working the ground than a disc implement, but they break more roots and are less costly in upkeep. Shares for these two implements are practically the only thing (other than oil) on which there is much wear. Cultivator shares can be purchased for about 1s. each at the present time, which will give long service in this country. Skim plough shares can be made on the farm at a cost of about 6d. per piece if one purchases the steel in bulk. For planting the seed, I prefer a disc drill is preference to the combine, because the drill is less costly to operate, does not give the land a tendency to drift, and can cope with more rubbish than a combine. For fallowing I favor a good plate plough, because it cuts and turns all ground at an even depth—something which cannot very often be said about a disc plough, because of the side play and wear in the disc box. They are costly to replace, and, therefore, are not replaced as often as should be, hence a bad job is made. For hay cutting I prefer a binder not more than a 6ft. cut, because a binder is a machine that is not used at any other time of the year and does not, as a rule, do a very great acreage, therefore I do not think a wider cut than 6ft. is necessary. The owner of a binder should always drive his own machine, because it is an implement that requires a little more care and attention than the average farm implement. Attention to lubrication,

tightening of bolts, correct tension of string, and correct setting of packing table, &c., are points that are often overlooked. The binder should be put in the shed immediately the binding is finished. For chaff cutting a cutter that will put through from two to three tons per hour is not too big, and will save a lot of time. To drive a cutter this size it is necessary to have a fairly powerful engine, one of about 8 H.P. to 10 H.P. In purchasing an engine it is advisable to have a portable one, because not only is an engine used on the chaff cutter and corn crusher, but it is essential to have an engine for the power winnower and various other jobs on the farm. The harvester is favored for taking off the crop. I admit that there is a fair margin in favor of the harvester over the stripper and power winnower when purchasing, but that is not the only aspect of the question. It requires eight horses to work a 9ft. harvester comfortably with chaff carrier attachment, whereas the same number of horses will work two 8ft. ordinary strippers, therefore several acres a day more can be reaped with the same number of horses. By this comparison it can readily be seen that there will be a big saving in horse feed by the time harvest is finished. This is not the only advantage the stripper has over the harvester. Bearings are another factor. There are at least three times the number of bearings on a harvester (besides various chains and belts) than on an ordinary stripper. A stripper will last for years longer than a harvester, particularly if light crops are being handled. For wheat cleaning the power winnower saves a good many bags of wheat in a year by thrashing all heads that were not previously thrashed. It also saves a lot of time and trouble. This machine, like all other farm machinery, should be repaired if necessary and put in the shed immediately harvest is finished."

The meeting of April 1st was attended by 15 members, when a paper, "Breeding and Breaking in Colts," was read by Mr. A. Ramsey. (Secretary, Mr. C. Masters, Verran.)

April 21st.—Present: seven members.

SEEDING OPERATIONS.—Mr. H. Smith contributed the following paper:—"Seeding operations start with fallowing. Fallowing consists of the preparation of a good seed-bed and gives best results if kept in good condition, free from weeds. Sowing can be commenced as soon as a good rain has fallen. In this district oats may be sown in April and wheat from the 1st of May to the middle of June. Dry pickling has several advantages over the wet method; the seed germinates more quickly, and pickling can be done any time between harvest and seeding. A disadvantage in using copper carbonate is that if inhaled it causes an irritation of the nose and throat. Further, it is liable to clog the drill. The drill should be turned every morning before starting to save breakages. Bluestone is more pleasant to work with and gives good results. No wheat that contains smut should be sown. All land should be well cultivated before seeding. I favor the disc drill for sowing, and all land harrowed where possible two or three days after sowing, to pack the ground and loosen the surface so that all plants can get through. Where land is of a drifty nature, it should be left as rough as possible. When new land is to be sown it should be ploughed early, wet or dry, because the crop will have no weeds to contend with. If a clean burn is secured, a foot plough should be used, otherwise the disc is better in sticks, &c. When rains are late, new ground may be drilled in dry with fair results, and new land should be harrowed after sowing to level and pack the ground. See that all implements are in good order when starting; have a few spare swings, books, &c., on hand, and horses in good condition, so that seeding may be completed without hindrance." (Secretary, Mr. C. Masters, Verran.)

STREAKY RAY (Average annual rainfall, 14.91in.).

November 21st.—Present: 13 members.

SAND DRIFT.—Mr. J. Drever read the following paper:—"Having been farming on light, sandy soil for over 20 years, I claim to have had some experience of sand drift. Prior to this country being cleared for farming, there was very little drift, therefore it is apparent that clearing all the natural growth off the land increases the risk of drift. Unfortunately, many thousands of acres have been cleared without any thought as to whether it would drift or not. It is now well known that the tops of many high hills do not grow very good crops or very much feed, and are the starting points for much of the drift, and should have never been cleared. Another very serious cause of drift is overstocking in dry periods, especially with sheep. It can be safely said that if a horse, a sheep, and a cow in equal condition were placed in a three-acre paddock to live on the natural growth, the majority of farmers would agree that the sheep would live the longest. Therefore, they must be the worst offenders in eating out all the protection the land has from wind. Sheep also have a habit of camping on high hills on hot days, and they dig holes there, and eat out the grass roots and leave the hill in such a condition that the sand moves about with every wind that blows. Sand drift is worse than fire. It will kill crops and feed, cover and render useless fences and other

improvements, and if it continues year after year, the soil becomes poor for the want of organic matter. It is then a difficult matter to get anything to grow on the soil. A paddock or a farm that gets in that condition is a source of worry and expense to the owner, and will eventually ruin him, unless the drift is checked. Any preventive methods that may be used must depend largely on the locality and materials that are available. When clearing scrub, breaks should be left, especially on high ground and on the tops of hills that are considered to have poor soil on them. Where land has already been cleared and begins to show signs of drift, sheep should be kept off it, even if they have to be sold on a poor market, because, if by selling them the land is saved from drifting, it will pay the farmer to be without them until the land improves. In many cases if the most likely places to drift are not fallowed, but watched and farmed carefully, drift can be prevented to a great extent. On the extreme tops of hills, where drift first shows signs of starting, it is a good plan to make some sort of a break—either brush, stones, stumps, or straw will answer the purpose. If they are placed in lines so as to form a square, say a chain each way on the worst part and larger squares around, it will have some effect on the drift. Where there are big areas of drift, all efforts to control it should be made on the northern, western, and southern sides. Much has been said about keeping a ridged surface on this class of drift, but unless there are plenty of grass roots in it, any attempt to keep the surface rough will be wasted, for it will take very little wind to level it out again. I favor sowing this class of drift with a quick-growing wheat that does not stool very much as soon as possible after the first good rain. If the plants get a start early in May, they will grow quickly while the ground is warm. Any weeds or grass that are likely to grow should be encouraged. Rye is a very good plant to withstand drift, and would be well worth trying on some of the worst patches. Cross drilling with double the amount of seed will also have some beneficial effect. Should a crop be cut with drift just after it comes up, much good will be done by coupling up as many horses as one can conveniently manage and driving them up and down the worst sides. A large area of land can be got over in a day, and the tracks of the horses would have to be filled in before drift could do any further damage. Wheats that stool well, or malting barley, will not stand the same amount of drift as a variety of wheat that grows up quickly. Should a farmer be fortunate enough to get a crop on three parts of a drift paddock, it will be wise to leave the stubble as high as possible and cart straw on to the patches that are still drifting. Sow again the following season, and keep all stock off the paddock until it gets a good coating of vegetation." Mr. P. Anderson read a paper, "Farm Book-keeping." (Secretary, Mr. C. Thom.)

WADDIKEE ROCKS.

March 7th.—Present: 12 members.

BIRDS, THE FARMERS' FRIENDS.—Mr. W. Heir read the following paper:—"Many farmers have noticed how often starlings are seen on sheep's backs. If there are any lice or ticks on the sheep they will pick them out of the wool. These birds are very fond of figs and other fruit, but they make up for that in the good they do by killing many grubs and insects. The "Willie Wagtail," or Shepherd's Companion, is often seen around sheep, and if they are allowed to get tame around the house, will fly in and kill a large number of flies. It is one of the best bird friends we have. The small brown bird is a great worker at killing all kinds of small insects, and their nests should never be destroyed. I believe the Crow does a great amount of good by keeping down the blowfly pest, which is a great source of loss to all sheep owners. The Magpie is a very good friend to farmers and kills a great number of insects and flies. There are a number of other birds of great value—the Ibis is one of the best, and we should never kill or hurt any of these birds; they are great mousekillers. On the occasion of the last great mouse plague, the Ibis came along in large flocks, and it was interesting to see them killing the mice. Night-flying birds.—We have referred to a few of our day friends, but we must not overlook our quite as valuable night friends. We have the Mopoke in our district, they do an immense amount of good in killing mice and other vermin. There are a few owls in this district, and these render very valuable help to farmers. Let us do all we possibly can to discourage boys from bird nesting. They are doing themselves, as future farmers, a great wrong. Encourage them to be kind to all birds, and instead of breaking down their nests to help the birds by breaking down under branches that might assist foxes or cats to reach the nests. A Bird Protection Club would be of great benefit to all farmers. Boys should be taught to recognise the useful birds and to do all in their power to protect them." (Secretary, Mr. V. Matthews, Kyancutta.)

April 14th.—Present: 12 members and three visitors.

TRACTORS v. HORSES was the subject of a paper by Mr. G. A. Graph. He said that tractors did not require the same amount of attention as horses, and not so many farm implements were needed as were necessary where horses were used. Where the farmer

was a long distance from water, horses were at a great disadvantage, because it would be necessary to use a truck for carting water and its upkeep would equal the cost of repairs to a tractor. The petrol used for a truck would take a large amount of the kerosene account for a tractor, because 1½galls. of kerosene could be bought for the price of 1gall. of petrol. It would take 6galls. of petrol per week for water-carting, which would allow an additional 20 acres to be put in at the same cost as where horses were used. In addition, one saved a day's work at water-carting, in addition to the extra hours gained while horses were feeding. A point for consideration was the extra sheds and yards required for horses. They required both time and material to make. Fencing was also necessary with horses. The use of a tractor saved time during the lunch time spell, and at night horses required a great deal of attention. If a block could be grazed with sheep, the profits from the wool and lambs would pay for the kerosene used by a tractor. Sheep also improved the land for wheat-growing by packing fallow, keeping down weeds, and manuring the land. He considered that the cost of horse breeding would almost equal the price of a tractor. He submitted the following figures:—Horses: 20-hoe combine, £120; binder, £90; chaffcutter, £50; engine, £100; lorry, £260; harvester, £220; harness, £50; water tanks, £10; trough, £5; feeders, £5; chaffroom, £20; yards, £5; 10 horses, £200; total, £1,115. Tractor: Combine, £120; harvester, £220; lorry, £260; tractor, £400; total, £1,000. Working expenses:—Horses: Hay, 30 tons at £3, £90; petrol for water carting, £17; set tyres, £40; repairs to truck, £20; repairs to harness, £10; oil for lorry, £3; petrol for chaffcutting, £5; binder twine, £3; repairs to binder, chaffcutter, and engine, £10; man's wages for water-carting and general assistance, £100; man's board, £50; repairs to fences, £10; total, £258. Tractor: Kerosene for fallow, £35; seeding, £19; harvesting, £25; truck tyres, £40; repairs to truck, £10; petrol for wheat carting, £25; repairs to truck, £20; total, £139. No allowance has been made for profits from grazing sheep on land otherwise used for growing horse feed. (Secretary, Mr. V. Matthews.)

WALLALA.

March 11th.—Present: 11 members.

SHEEP AND WOOL.—Mr. W. Baldock read a paper on this subject, in which he gave his experience with sheep over a period of years in these districts. In the discussion that followed, Mr. H. Brown recommended that ewes should not be too fat when mating. He recommended the Merino for these districts. Mr. Agars recommended the Merino. He stated that sheep carrying heavy and dense wool would not do so well in the lighter rainfall districts as the sheep carrying the lighter class of wool. (Secretary, Mr. C. Zippcl.)

WARRAMBOO.

March 4th.—Present: 12 members.

IS IT ADVISABLE TO CONTINUE TO GROW WHEAT?—Under the heading, "Shall We Put in a Crop this Year?" the following paper was read by Mr. F. Daniel:—"This is one of the most important questions of the moment. Never before in the history of the Commonwealth, and probably not ever before in world history has the farmer—the wheat producer—been in the unenviable position in which he finds himself to-day. For four years wheat production in this State has been carried on at a loss. Of the various reasons, the prolonged and abnormal drought conditions have been a largely contributing factor. Undoubtedly, this, combined with the record low prices ruling for our commodities, has rendered what has proved a better growing season of less avail. Farmers are in an unenviable position. Years of hard labor have gone into their farms, which are heavily mortgaged. Many farmers are saying, 'Why put in any crop this year, or accept any assistance to do so, when we know full well, even with heavy yielding crops, our efforts must prove another heavy financial loss while the present wheat values and conditions exist.' Others reply, saying 'How are we ever going to better ourselves if we remain idle?' I cannot see how any farmer in the mallee districts can afford to allow such a thing come to pass. The mallee lands must be cropped to remain clear and of any value. Now if an inspection is made of the result of the inquiry by Professor Perkins, Director of Agriculture, and published in the April issue of the *Journal of Agriculture*, one will find that it is said that the costs of production on Eyre Peninsula are very much lower than to be found elsewhere throughout our State. With wheat below 3s. a loss seems inevitable, but will probably not be so great as would be the case if the farmer did not put the crop in. First, we would have the heavy depreciation of our improved land values, whereas by cropping again that value would be rendered greater. And then it is said, 'The whole community is dependent on the farmer,' but at the present time this is hardly so. The farmer assuredly remains the backbone of the country, and yet at the present time he has been rendered dependent on others. If assistance for another seeding is forthcoming, the best course for farmers to pursue is to put in as much crop as they can really well, sowing about

40 lbs. super to the acre with the minimum amount of seed, and giving the ground the maximum amount of working. Further, as profit on wheat growing has become so uncertain, it behoves every farmer to endeavor to become as self-supporting as possible. This means more side lines. Poultry, pigs, and possibly cows, but essentially sheep. The farmer would be wise, on entering on the side lines mentioned, to select only from good reliable stock and use his crop yields to maintain same. More attention might also be given to orchard work and gardening, and plantations or forest timber. Efforts carried on in these lines would materially assist the farmer to become more self-supporting, and the enhanced value of his holding, together with profits in his business, would in time free him of his present heavy liabilities. In support of this theory a comment might be made on the vexed problem, tractor *versus* horses. A farmer can feed and maintain the strength and usefulness of his horses from the direct product of his ground, but can the same be said of the tractor? An honest endeavor should be made by all to crop as large an area as possible, use as much of their crop yields to raise profitable side lines, and endeavor to get more of their living by direct production of essentials. Continued production is the only way out."

FARM ECONOMY.—Mr. E. Oswald read the following paper:—"First it is necessary to distinguish between false and real economy. Our living expenses have already been reduced to a minimum, as also has money that should be spent on recreation. These items should in reality be the last to suffer from economy cuts, but, unfortunately, they are usually the first. The altered position of wages to hired help makes a considerable difference from the viewpoint of small machines and labor-saving devices and implements to what we have previously seen. It will pay farmers to make shift with smaller machines and teams, and employ extra labor, than to incur new expenses in the purchase of up-to-date machines. The combine has been adversely commented on as a seeding implement for mallee farms—its one point in favor as against drill and cultivator being economy of labor. This will now possibly disappear. Perhaps our greatest economies should be in the direction of smaller areas sown and under better conditions—that is, good fallow and proper rotation of crops, obtaining a good class of breeding animals and adopting fat lamb raising, and poultry. The economies to be aimed at in these directions are the introduction of a good class of bull for dairy cows, and increasing the number of good cows kept; to get a good class of ram for the sheep flock, and adopt the best methods of improving by line breeding. Poultry, perhaps, offers one of the best side lines, and I would refer members to Mr. Anderson's views as published on page 748 of the February *Journal of Agriculture*. Our present method of selling eggs to a local store is wasteful. In connection with the projects that we should adopt in reconstructing our farming practices, we should co-operate and thereby reduce expenses. There is a considerable economy to be effected in the buying of our requirements in bulk and by co-operation." Mr. P. Daniels, speaking on sheep on the farm as a paying side line for profit, pointed out that he had 300 sheep on his farm. He sold his wool in Adelaide at 4½d. per lb. this year, and received a cheque for £34. Out of this he had to take the cost of shearers, woolpacks, carriage and freights, besides the interest on the capital outlay for his flock. Mr. O. Murphy thought that the sowing of less wheat and going in for more side lines meant that the farmer would have to leave out more land, and this would mean that he would have to scrap a lot of machinery, especially if he went in for more sheep. Mr. Daniels said if the farmer decided to go in for more sheep he would still be obliged to grow wheat to have the stubble for grazing. Mr. A. Collins thought that, although wheat growing at the present time was not a paying proposition, the farmer would still have to continue to do so, as he would find that his land would deteriorate considerably if left unworked, and the shoots of the mallee would soon get up again, when the farmer would be compelled to deal with them as before. Mr. Murphy thought the growing of wheat, combined with a few sheep and possibly a cow or two, should be the aim of every farmer. Mr. F. Chilman was of opinion that it would not pay to lose sight of the fact that, if the farmers of these districts decided to grow less wheat and go in for more sheep, they would be taking a step in the wrong direction; owing to the newness of the land the farmer had to continue working the land in the new districts to combat and destroy mallee shoots, and to put the land in heart to grow the necessary feed for sheep. He mentioned instances in districts where the farmer had decided to go in for more sheep and less wheat. They had found it not so profitable as they thought it to be, and had disposed of the greater part of their sheep and returned their efforts to wheat growing. This, he thought, was proof enough that the growing of wheat and sheep was essential on the farm. (Secretary, Mr. E. Adams.)

April 8th.—Present: eight members.

SPORT AND RECREATION.—"Is Amusement Essential to the Farmer?" was the title of the following paper read by Mr. O. Murphy:—"The old saying, 'All work and no play makes Jack a dull boy,' is as true of the outdoor worker as of the man whose occupation keeps him indoors. All may not agree that amusements or recreation of some

sort are essential, but few will deny that they are necessary. We are passing through a very difficult time at present. The farmer must reduce his costs of production. He can do so by dispensing with hired labor, and by increasing personal efforts. The times appear to demand more work, less play, and unfortunately less pay. But the fact should not be lost sight of, that time spent on a reasonable amount of rest and recreation will not necessarily mean a reduction in the amount of work accomplished at the end of the year. Leading minds in the industrial and education world recognise that the attainment of sound, healthy minds is not possible without due attention to the attainment of sound healthy bodies. Our public schools and universities encourage games and sports in the interests of good bodily health and development; in some instances, the participation in some form of sport is compulsory. In practically all industries and professions in this country, the worker and professional man has Saturday afternoon to devote to sport and recreation. The farmer is more or less a free agent. His work in the field is conducive to good bodily health and development. He can, if he wishes, work the full six days of the week, but apart from the question of the value of recreation, the fact is frequently lost sight of that the farmer has to compete for labor with other industries in which the Saturday afternoon has long been recognised as a free afternoon for the worker. If we as farmers wish to compete successfully for a good class of labor, we must recognise the claim of the hired man for a free Saturday afternoon, even though it may mean a suspension of work on Saturday afternoons in the busiest periods of the year, seeding and harvest times. Our recognition of the value of recreation and sport will not, in the opinion of the writer, decrease the efficiency of the work done on the farm. Rather will it tend to make farm life more attractive. The sons born and bred on the farm will be more likely to stick to the land when they reach manhood. The laying down of a tennis court on the farm, or the construction of a cricket pitch, on public grounds are probably better investments than we are wont to think." (Secretary, Mr. E. Adams.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Kelly.....	4/4/31	12	Paper—"The Progress of the Farmer," Mr. Ryan	M. Martin, Kimba
Laura Bay .	14/4/31	16	Discussion	W. Edson, Ceduna
Pinkawillinie	29/11/30	11	Conference Reports	S. Johnson
Pinkawillinie	24/1/31	12	Address—Mr. W. Miller .	S. Johnson
Pinkawillinie	21/3/31	7	Harvest Reports	S. Johnson
Pinkawillinie	18/4/31	14	Papers—Messrs. H. Wheeler and S. West-over	S. Johnson
Pygery	2/5/31	18	Address—Mr. Wyld	A. Day
Calca	6/5/31	15	Discussion	J. Cosh, Mortana
Smoky Bay .	2/5/31	15 and 7 visitors	Discussion	K. Harrison
Green Patch	30/4/31	6	Discussion	C. Whillas, Port Lincoln
Mudamuckla	11/4/31	8	Address—Mr. W. H. Brownrigg	T. Zippel
Taragoro ...	30/4/31	12	Discussion	T. Winters, Cleve
Kelly	2/5/31	8	Discussion	M. Martin, Kimba

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

KANNI, December 13.

THE ADVANTAGES OF THE AGRICULTURAL BUREAU.—Mr. A. Koch read the following paper:—"The object of the Bureau is to assist the man on the land. Members should be encouraged to ask any questions of interest to men on the land concerning which they may require advice. The meetings enable them to discuss subjects that are of vital importance, and members can benefit by the experience of others. The necessity for regular attendance is of great importance. This usually indicates those who appreciate the privilege of being a member. No one expects a member to attend every meeting, as

circumstances at times with apology. This will be most encouraging to the Secretary and the Branch itself, who will understand that the absentee has the welfare of the Bureau at heart. If a member does not wish to attend the meetings any longer, he should notify the Secretary immediately. The Secretary has to notify every member of the Branch concerning meetings, and finds it hard and sometimes apparently a waste of time when only a small percentage respond to their duty. Homestead meetings and social evenings are of great interest to Bureau work. On these occasions members can get in touch with their friends and explain the aims and objects of the Branch. This would show a good spirit and the outsider would soon realise the benefits derived from the Agricultural Bureau." (Secretary, Mr. J. Woodhead, Waikerie.)

KULKAWIRRA.

April 14th.—Present: 14 members.

BEST SEEDING IMPLEMENT.—Mr. L. Jolly contributed the following paper:—"I prefer the mallee type trip-tine combine, with high and wide wheels; it is light in draught, and has a good clearance. A combine has many advantages over a disc drill, especially in stony country. It will go under and push aside a large portion of the obstacles, whereas the disc implement rolls over the tops and leaves the seed lying on top. A combine does away with one man in seeding time, and cultivates and drills



Mr. A. Wedd, who at the Pruning Competitions held at Mypolonga on June 4th, Won the Fruit Tree Section, Tied for First Place in the Vine Section, and obtained the Highest Aggregate Points in the Competitions.

in one operation. It is a mistake for a farmer to seed with a combine on a scrub block, because there are many loose stones and bushes. This implement will pass through stumps and stones up to approximately 1ft. in diameter without any trouble, and about 60 per cent. of the bushes, such as appear on new land, providing they are not more than one year old. There should not be very much trouble in putting in stubble ground, providing a good job has been made of burning. If the straw is light, it should be knocked down before fire raking. When combining stubble ground, roots of the previous crop give a little trouble; they collect around the boots and cause weeds to heap up on the roots. This can be remedied by pulling the tubes out of the boots, but it is then necessary to pull a light set of harrows behind, because the back row of tines does not bury the seed sufficiently. In many cases the tubes on a combine have been known to last three years without any renewal. Do not attempt to fallow with a combine, unless the work is done very early, so that weeds can be destroyed before they are

too well as d A combine has small shares compared with a cultivator, thus allowing large weeds around the tines without being cut off. In seeding time, if weeds are large and thick, the land should be cultivated with the combine and harrowed before combining." (Secretary, Mr. H. Elliot, Karoonda.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

February 21st.—Present: 22 members.

HINTS ON DAIRY CATTLE MANAGEMENT.—Mr. A. Braendler read the following paper: "Try and get the best cows procurable. A good dairy cow will not eat any more than a bad one, and, if well fed, will produce more milk than the inferior one. The Jersey cow is a good creamer. She is small and does not require so much feed as the larger breeds. The Jersey does better in a warmer and drier district than in a wet and cold locality,



The Judges at the Pruning Competitions, Mypolonga, June 4th.—Messrs. W. E. Noles and B. W. Edson of Mypolonga, and E. Leishman (District Horticultural Instructor).

where there is not much shelter. The Shorthorn and the Holstein are larger animals and consume a good deal more feed. They give more milk, but it is not so rich in cream. So far as the disposal of calves, or the cows when their milking days are over is concerned, the larger breeds always realise a better price from the butcher. Plenty of good, clean water is required, to which the cows should have free access. Sweet bone-meal should be placed in a box or trough handy for the cows to have a lick. If green feed is available all through the year, the best return from the cows will be received. In many districts this is not possible during summer, and they will have to be fed with bran or crushed oats in the chaff. Never change the feed suddenly; do this gradually, especially if grain fed, or the animals will be upset. Breed only from a well bred bull which comes from a proved milking strain on both sides, and only keep the calves from the very best cows. The calf should get the milk from the mother for the first few days after it is born. This can then be diluted with a little separated milk mixed with fresh milk for a about a week. After that put the calf on all separated milk. Always add a small quantity of calf food. Feed the calf three times a day. Provide a shelter shed for the calves to keep them warm in winter and out of the sun in hot weather.

Have a small paddock well fenced so that the calves never learn to creep. Give the calf a little bran or oats in the chaff and provide plenty of grass or hay. If well looked after, it will grow quickly and develop into a better cow than a neglected one. Do not mate heifers too young. Jerseys can be bred from six to nine months earlier than either the Shorthorn or Holstein. A well-grown Jersey can be in milk when two years old. When young farm-bred heifers come in, they are generally quiet. Tie them up on the head or put their head in a bail. Never leg rope them if it can be avoided. A good plan is to handle them quietly and milk them while you are standing and put the other hand on the rump to keep them over, and after a few milkings like this you will be able to sit down and milk them with both hands." (Secretary, Mr. C. Altmann.)

March 21st.—Present: 27 members.

CARE OF IMPLEMENTS.—The Hon. Secretary (Mr. C. Altmann) read the following paper:—"The Plough.—If one wishes to do the work properly, the plough must be in perfect order; it must run and cut straight and level, not have one body cut an inch or two deeper than its neighbor. If the plough is strained, straighten same or cause it to be straightened. Also see that the shares are of a uniform length, not one worn and perhaps four or five new ones, or *vice versa*. The seedbed must be level, and this cannot be obtained if the plough is out of order or the shares not of a uniform size. A plough out of alignment will pull harder and also leave a rough surface. See that the plough leaves a level surface and do not rely on the cultivator to do this later. A twisted plough will make the work harder for the horses and also the tractor. It may cost a little to have the plough in apple-pie order, but it pays. **Harrows.**—The tines should be of uniform length, the harrow frames sound. Well-conditioned harrows will pull hard, but they do good work in packing down the fallow. **Cultivator.**—Strained tines should be discarded; they will not leave a level seedbed. Care should also be taken to see that the tines have not slipped in the clamps. If this has happened, the clamps should be loosened and the tines set uniformly. Strained tines will not cut the weeds properly, and the share on a strained tine will wear much quicker than others. The implement should be so set that the cut of the share is almost level. **Combines and Drills.**—See that these implements are set at the proper spaces apart, not one sowing 8 in. or 9 in. apart and the other 3 in. or 4 in. This is especially noticeable on combines where the shoe is apt to slip over if it works loose. Tighten clamps after bringing in line. A good plan is to use spring washers; these hold the nut much better than an ordinary washer. **The Drills.**—The discs or hoes should be rigid and not wag. A few packing washers will, as a rule, accomplish this. See that the machines do their work right, cleaning them out after the season is over; never leave remnants of super and seed in the drill. Clean out and give a good wash with kerosene. Before starting, turn by hand by jacking up one wheel and turning same. **The Binder.**—This machine should be in good order before starting. That is best done by leaving a note in the toolbox of all defective parts when finishing harvest. Replace all worn parts before starting. Tighten up all loose bolts, and if this cannot be done, put in a new bolt or pack up with washers. Do not forget to sharpen the knife, and see that the comb is set straight to ensure free running and easy draft. It is surprising how much hay is left in the field when the knife is blunt and the comb incorrectly adjusted. Some seasons it is advisable to have a can of water in the field and pour some on to the knife to prevent same from clogging. **The Harvester.**—The same applies to the harvester in general as to the binder. With this machine, care should be taken not to blow out wheat. Some will, to get a good sample, put on a strong blast; in most cases this is not necessary—the trouble lies in the set of the machine. If a farmer studies the machine he will soon locate the trouble. **Vehicles.**—Attend to wheels on horse-drawn vehicles during the summer months. Do not use them with loose tyres; it is false economy and will only spoil the wheels. A well-tyred wheel will last indefinitely compared to a wheel with a loose tyre. Again, see that every bolt is tight; loose bolts wear the woodwork, and after a short time it will be impossible to tighten up. **Lorries.**—See that everything is and remains shipshape. It may appear costly at the first, but it will pay in the long run. **Lubrication.**—This applies to all vehicles, machinery, and implements. Do not forget to lubricate, and use the right kind of lubricant. To use oil where grease should be employed is foolish. Present-day lubrication is far ahead of what it was 10 years ago. If oilcups are fitted and the owner finds grease would be better, he can easily unscrew the oilcup and put a greasecup in its place. Always buy the best of oils. Oil little and often. Do not give an overdose and then expect the machine to run a certain time. Oil as it is required, not as you think fit. **General Care.**—Do not use fencing-wire to effect a repair; it may occasionally be necessary to use wire, but replace this with a bolt at the first opportunity. The implements will pull out of shape if one part is hung together loosely. One cannot secure as effective a joint with fencing-wire as can

be done with a bolt. After work is over, house the implements. This does not apply to ploughs, cultivators, and harrows, but drills, binders, and harvesters should not be left exposed to wind and weather. Thousands of pounds have been wasted in Australia through this practice. When housing, do not worry to clean off any old oil; good oil will not gum, but can easily be cleaned off with an old broom before starting. Do this, and then use kerosene freely on all bearings. Then before setting out use good oil freely on all bearings and there should be no trouble."

April 18th.—Present: 23 members.

EXTERMINATION OF PESTS ON THE FARM.—Mr. J. Lofthouse presented the following paper:—"The most destructive pests on the farm are rabbits, foxes, and crows. *Rabbits*.—A good plan to get rid of these pests is to insert one end of a piece of tubing in the burrow, and fasten the other end over the exhaust pipe of a motor car or motor cycle. An old bicycle tube will do. Then fill up the burrow, taking care not to allow dirt to block up the tube. Also fill in all surrounding burrows, blocking all exits. Set the engine running and the fumes will eventually choke the rabbits. Trapping is also effective, but is very slow. Foxes also have their lairs in the ground, which prove a nuisance when a team of horses has to be driven over them. Foxes pester the farmer mostly at lambing time. Skins are rather valuable, and it pays one to skin them. Poison seems to be a most effective method of dealing with this pest. Place the necessary amount of poison in the mouth of the fox's latest kill. The fox often goes back to its kill of the night before. Care should be taken not to touch the bait with the hands whilst applying poison. Another way is to drag a carcass of a dead sheep or lamb over the ground frequented by foxes. At intervals place well-secured covered rabbit-traps on the ground. Crows greatly reduce the revenue from poultry. Whilst shooting is the best way of dealing with this pest, the crow gets to know a gun, and gives it a wide berth. Place an egg on the roof of a straw stack (not frequented by fowls), place rabbit-traps covered by straw in the vicinity, and leave them. Another is to poison a carcass in a paddock, or shoot a crow and hang it up near, or on the fence of the fowl-house. This will keep crows away from the fowls." Discussing the paper, some members favored fumigation for rabbits, using sulphur and cocky chaff, it being the cheapest, and equally as effective as the exhaust fumes of a motor. A good plan, where possible, after fumigating, was to plough the burrows to a depth of about 12in. In



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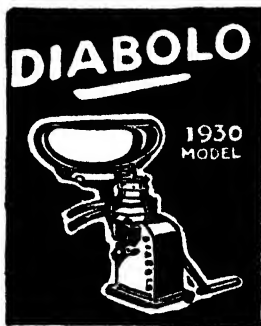
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most cases the warren would not be re-opened. To destroy foxes, all agreed that poison was the best. Mice and sparrows made good baits. One member asked for a remedy to rid a place of rats. The Chairman said he found tar very effective. His mode of procedure was to pour tar in the holes made by the rats. He said he found they did not like the smell of tar and would soon leave the place. (Secretary, Mr. C. Altmann.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Marama	29/4/31	25	Address—Mr. R. L. Griffiths	T. Hinkley
Caliph	14/4/31	10	Annual Meeting	W. Todd
Lameroo ...	24/4/31	11	Paper—"Problems of Wheat Marketing," Mr. A. J. Koch	R. Koch
Lameroo ...	5/5/31	13	Address—Mr. W. J. Spafford, and Presentation of Prizes	R. Koch
Lowbank ...	28/4/31	7	Address—Mr. C. Goddard	L. Geyer, Waikerie
Yurgo	22/4/31	7 and 10 visitors	Address—Mr. R. L. Griffiths	M. Walker
Pinnaroo ...	14/4/31	—	Address—Mr. H. Johnston	H. Badman
Pinnaroo ...	28/4/31	15	Address—Mr. H. B. Barlow	H. Badman
Parilla	14/4/31	11	Address—Mr. R. L. Griffiths	C. Foale
Boolgun	30/4/31	7	Annual Meeting	J. Palm
Bowhill	20/4/31	18	Address—Mr. R. L. Griffiths	M. Banks
Meribah	11/5/31	10	Formal	E. Carr

SOUTH AND HILLS DISTRICT.

HARTLEY (Average annual rainfall, 15in. to 16in.).

March 4th.—Present: 12 members.

AGRICULTURAL EXPERIMENTS.—Mr. W. Brook gave the following report of the experiment conducted on his property:—"This plot consisted of 1 acre of loamy ground, ploughed in August, 1929. It was harrowed on September 3rd, cultivated on September 30th and again on October 14th, harrowed October 23rd, cultivated January 3rd, harrowed January 7th and April 14th. The last cultivation before seeding was on April 18th. Combined April 28th, and harrowed May 3rd. Rolled with a wooden roller on May 27th, and harvested on December 18th, yielding 24bush. Expenditure—Super, $\frac{1}{2}$ cwt. 100 per cent. Cresco at 12s. cwt., 6s.; seed wheat, $1\frac{1}{2}$ bush. at 5s. bush.; ploughing, 6s.; harrowing, five times, 5s.; combining, 2s.; rolling, 1s. 6d.; harvesting 8s.; rent of land, 10s.; pickling, 3d.; rates and taxes, 8d.; bags (eight), at 9d. each, 6s.; cartage on eight bags, at 6d. per bag, 4s.; cultivating four times, at 1s. 6d. each time, 6s.; sewing bags (eight), at 1d. each, 8d.; twine, 3 $\frac{1}{2}$ d.; total expenses, £3 2s. 7 $\frac{1}{2}$ d."

ROAD MAKING.—The following paper was read by Mr. W. Birmingham:—"Years ago, when there was no motor traffic on the roads, the metal was cracked down to 2 $\frac{1}{2}$ in., now when it is nearly all motors we do the same thing, and wonder why the roads are always working up with loose stones lying about. This is because rubber tyres will not crush the stones as the iron tyres did. When the metal is spread on the road it should be broken down very fine, leaving nothing on top more than $\frac{1}{2}$ in. gauge. Roll it well in wet weather. Use soft limestone, if possible, and one class of stone—not some hard and some soft. Soft stone will make a smooth surface, and that is what is wanted for motor traffic. When using hard stones make them as fine as possible, and do not allow any blue or ironstone on top. If rough roads were scarified well and levelled and then broken down fine, it would be a great improvement."

LUCERNE FOR FODDER ON SMALL HOLDINGS.—At the meeting held on April 18th Mr. W. Yates read the following paper:—"Lucerne is the most useful of all green fodders. Cows, pigs, sheep, and poultry do well on it, and as it grows in summer, when all other

grasses in these districts are dry, it is all the more valuable. Nothing else gives the same return in bulk if the crop can be irrigated, and grown without water on suitable land it gives a good return. If, when planting lucerne, it is to be irrigated, do not spare the seed. If the crop is to be hand sown, a tea cup of seed mixed into half a kerosene bucket of super, sown that it works out to 12lbs. of seed to the acre, is not too much. A thick stand serves two purposes, it helps to smother weeds and keeps the lucerne from getting clumpy or tussocky. If the first cut is made when the plant is about 6in. high, it is not too soon. Be sure to make all cuts as close to the ground as possible. When irrigating one good soaking as soon as the lucerne is cut, is, in most cases, sufficient, especially if there is a good depth of soil, but if a reef of rock runs near the surface, when the plant is about 1ft. high it begins to wither and another watering is necessary to revive it. Lucerne will stand heavy dressings of manure when established. If about two bags of super to the acre are sown in early spring, the crop reaps the benefit later on, and if after the second cut (or even after each cut, if you have the manure to spare) a good layer of stable manure, or failing this, well rotted cow manure, helps to hold the water when irrigating, and also keeps the hot summer sun from baking the ground. In this dry district, where summer comes early, sow the main crop about August so that the plant gets a good start. The best result I obtained was when the lucerne was sown with barley about July. When feeding milking cows, it is necessary to cut the lucerne a while before you feed them. This does away with a good deal of the gas, and the milk does not taint." (Secretary, Mr. D. C. Harvey.)

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

February 19th.—Present: 12 members.

LESSONS FROM 1930.—Mr. C. Grosvenor read the following paper:—At this time last year we regarded the outlook for the 1930 season as fairly good. True, with the recent sudden decline in wool values (although we entertained hopes of an early recovery of this industry) and the long period of bad to indifferent seasons, the prospects for a quick return to national prosperity were not too bright. It was against the law of averages for us to experience another dry year, and Australians generally and their leaders derived consolation from this and urged primary producers to grow more wheat and produce more from our primary industries. Since then the wave of depression which engulfed all European countries and became world-wide resulted in so much unemployment and financial stringency that all kinds of produce declined in both price and demand. Perhaps never before was the importance of our primary industries so forcibly brought home to the people of Australia. As our primary produce constitutes 95.71 per cent. of our exports and manufactured goods only 4.29 per cent., and as fresh borrowing is difficult, obviously it is only from our primary industries that we can hope to meet our payments of interest and debts and the cost of necessary imports. High prices for wheat and wool were also responsible for a general neglect by farmers of such "side lines" as dairying, pig raising, poultry keeping, fruit and vegetable growing, which were left for the few who specialised in one or more of these. To-day we find that many are anxious to get back to the more arduous work of carrying on with these "side lines" for the sake of the quick returns realised on butter, eggs, &c. The prospects for the development of the dairying industry in this State are very promising. As a result of the planting of special fodders in the Mount Lofty Ranges and in the South-East, our dairy herds should be greatly increased. In most parts of the State sheep are seen in conjunction with wheat farming. Breeders are beginning to realise that lamb raising for the export trade may be profitably undertaken, and we hear of enterprising breeders importing sires and dams from the best English studs as a nucleus of flocks which will be reared to ensure that the right type of lamb will be exported for the London market. At present the pork and lamb markets in London are very weak, but as the total cost of slaughtering, freezing, shipping, and selling pork is 3d. per pound, it may be hoped that this trade will be developed. If this is to be done (and we have had it demonstrated to us by a recent shipment of pork) pig breeders, as well as lamb raisers must pay more attention to breeding and fattening. An order for 900 pigs was completed recently. The pigs were obtained from all parts of the State, and the mixed breeding prevented the shipment of a good, even line of quality pork. There has been a marked tendency for large estates to be subdivided and smaller holdings, practising more intensive culture, are becoming more general. Producers are realising that they can produce more profitably from small areas that have been set down to pasture and subdivided into small paddocks than on large holdings whose carrying capacity is only half developed. Land values have fallen and many with a little capital are anxious to work these small holdings. Tobacco growing in many parts of the State is profitable and will, in the near future, become a great asset to the country. During 1930, 40,000bush. of Navel and Valencia oranges were exported to Canada and

met with good demand. Efforts are being made to extend the markets established in Singapore and Sourabaya. Much headway has been made in ensuring that apples and pears consigned to England and the Continent arrive in good condition. Many setbacks to the development of this trade and many difficulties have been encountered, but with the help of science many of the disadvantages due to our geographical position are being overcome. As in other citrus growing areas, we, in this district, are beginning to realise that the productivity of our orchards can be improved by the application of nitrogenous manures in the form of sulphate of ammonia and leguminous crops. Most growers of oranges in this district suffered many setbacks during the season with split fruit, hail and wind storms, and ravages of grubs. Even after the fruit was harvested and despite careful handling, it was soon evident that there would be much waste before the fruit reached the consumer. We find that this was common to all and caused by seasonal influences and the fact that growers were compelled to regulate the marketing of their fruit to meet the poor demand. Fruit and vegetables this season have been sold at prices which, to say the least, are unprofitable to the grower, and, in common with other primary producers, growers are finding that their industries are on the verge of breaking down. The question of the most suitable stock on which to propagate orange trees has long been discussed, and much research work is being done in this direction. The lemon stock here has been proved to bring the trees to maturity earlier than others, but it has many disadvantages, mainly its susceptibility to collar rot. This disease, if dealt with in its early stages, may be satisfactorily combated, but if neglected will eventually kill the affected tree. All diseased bark must be cut away from the trees and all trace of the brown-colored sap removed from the cambium layer. The exposed part should be dressed with a solution of copper sulphate or Bordeaux paste. During this season Russian wheat, grown under conditions which we are informed are tantamount to slavery, has in no small measure been responsible for the present low value of wheat, but Russia cannot continue to sell wheat at this price indefinitely. Entertaining this hope, and knowing that wool is again coming in for more demand, we may look forward to again receiving remunerative returns from our main primary industries. (Secretary, Mr. H. Lewis.)

March 19th.—Present: Seven members.

REVIEW OF THE PRIMARY INDUSTRIES.—The Hon. Secretary (Mr. H. Lewis) read the following paper:—"South Australia is essentially a primary producing State, therefore it is necessary to look to the primary industries to keep the wheels of progress in motion. The total area of agricultural and pastoral holdings in South Australia is approximately 125,000,000 acres. The total population is approximately 500,000, and of that number only 55,000 are engaged in primary production, and the mean total revenue is about £15,000,000, or an average revenue of about £33 per head of the whole population. During the past two or three years prices for primary products have steadily been on the down grade until 1930-31, when it was difficult to find a market with prices obtainable below production costs. If this continues for another year many men on the land will be applying for relief. In this district the major portion of revenue comes from sheep, although gardens and dairying considerably help to increase returns. The majority of sheep men rely chiefly on the wool cheque for revenue, but the prices obtained for the last clip have been disastrous, except for the last sale, when prices were much improved. Since the last rise there seems to be a ray of hope for better prices for wool in the future, nevertheless the lesson has been, 'do not carry all your eggs in one basket.' We must look for other avenues that can be explored to tide over this period of depression. The district is undoubtedly suitable for other side lines. A solid export trade in lamb and mutton must be established, and so give the sheep man something to rely on besides the sale of wool. Also, the cost of production must be reduced and the price improved. If this is done the present period of depression in the wool and sheep industry will pass away as it has done in the past. With increased pasture more will be cut for hay, which suggests the keeping of cows to consume it, and with dairying there is plenty of separated milk to raise pigs to avoid waste. Of the egg trade it may be said there are three paramount needs in connection with this industry—(1) Keep only the best birds, (2) market eggs of the right size, and (3) the systematic organisation of an overseas trade. According to statistics this industry returns a million pounds per year. The demand for Empire butter is very considerable. The import into the United Kingdom in 1929 was 6,250,000 cwt., the chief sources of imports were—New Zealand, 20 per cent.; Australia, 12 per cent.; Irish Free State, 9 per cent.; other Empire colonies, 1 per cent. (making 42 per cent.); and Denmark, 34 per cent.; other European countries, 19 per cent.; Argentine, 5 per cent. (making 58 per cent.), which leaves room for expansion in the Empire butter trade. There was

a rise of nearly 2,250,000 cwt. in 1929 over the average of 1909-13, and out of the increase over three-quarters of it came from within the Empire, with Australia showing considerably increased output." (Secretary, Mr. H. Lewis.)

April 16th.—Present: 10 members.

SIMULTANEOUS DESTRUCTION OF FOXES AND PARROTS.—Papers by Messrs. H. Martin and H. Lush. In the case of foxes, it was decided that the month of May was the best in this district, as most rabbits were destroyed by then, and foxes would take baits more readily—such baits as parrots, fat pegs, squares of fat, liver, sardines, or old carcasses, etc. All baits should be laid well away from any thoroughfare. Foxes did a great deal of harm and caused considerable losses annually, the destruction of lambs being quoted at £40 by one member. Older residents could remember seeing the first fox reported in the district not so many years ago, and now it was not uncommon to see them in daylight. Parrots were increasing quite as rapidly as foxes and rabbits, and were more noticeable since the advent of Subterranean clover. These birds were very difficult to poison; they shelled all their grain foods, which made it practically impossible to poison them with any surface poison. They also destroyed fruit. Many residents had a small fruit garden, but very few picked any fruit off their trees this season. Rabbit destruction was a far easier work to perform, and with the present up-to-date methods of fumigation, the many makes of traps and poisons, it was possible to keep them in check. It was regrettable the prices of skins had fallen to such an extent that trappers could hardly make it pay. An interesting talk followed, and suggestions put forward as regards foxes are certainly helpful towards retailing the skin. Sardines well stirred with poison and nailed to a stump usually attracted the attention of a fox until the poison had sufficient effect on it to kill at the most 50 yards from bait. Set traps in sheep pads with weights attached and not pegged down, first of all removing all stock from the paddocks. When using parrots, it was better to keep for a week before laying them out and then bury, which appeared to make them more attractive as baits. Parrots appeared the most difficult to poison. An effective method was to mix arsenic and molasses with any grain, and a certain amount of arsenic will remain on their beaks as a result of the stickiness of the molasses. A new method put forward by one member was phosphorised grain, procured by having an airtight tin partly filled with grain, and after placing phosphorus in the tin, pour on boiling water and seal for 12 hours. One member had had good results with this method. For rabbit destruction, most members favored fumigation. If trapping and poisoning were done simultaneously a great many pests would be destroyed. It was decided to give a prize for parrot heads at per 100 as an inducement for boys to catch and destroy parrots. (Secretary, Mr. H. Lewis.)

KANGARILLA.

October 17.—Present: 12 members.

Mr. F. Smart read a paper, "The Destruction of Cape Tulip," and Congress reports were discussed. On November 5th members of the Women's and Men's Branches visited the Waite Research Institute. Sixteen members and visitors were present at the December 5th meeting, when a paper, "Increased Wool Production" was read by Mr. L. Tune.

GROWING CAULIFLOWERS.—Mr. G. Connor read the following paper at the meeting held on January 23rd:—"As in all crops, good seed is essential to success with cauliflowers. Sow in an open bed, not too thickly; an ordinary 6d. packet to two square yards. This is important; if sown too thickly they will grow with thin, weak stems and will never make good growth. The seed bed should be composed of light, loamy soil, so that when the plants are ready to plant out, they can be lifted out without damaging the roots. See that the soil of the seed bed is rich, with not too much clay. If clay is clinging to the roots, and in planting out it becomes pressed into a tight ball, it will prove fatal. Sow about the 1st March for large varieties, and I recommend Eclipse or Metropole for a good crop. Cover with a few old bags for a few days until the first leaves appear; then take them away and keep the bed watered. Keep down any weeds and thin out any thick patches. When the first rains fall, which may be in April or May, plant out into rich soil, 2ft. 6in. between the rows and not less than 2ft. between plants. A good plan is to plant in trenches, so that when they make big tops and the soil is soft with heavy rain, they can be earthed up and prevented from blowing over. When planting out, see that the seed bed has been well soaked with water the day before. Give each plant about a pint of water to start with, but on no account pug them in. Look out for grubs, green flea, and other pests. Keep them well dusted with some suitable insecticide, for if the tiny heart leaves are bitten they never recover. When they reach maturity there will be five or six great leaves there, but no heart. A very great percentage of the failures of this crop is due to the ravages of insect pests in the early stages of the life of the plant. To grow good cauliflowers, they must be kept growing from the time they show out of the ground, and to force them along is a simple matter with liquid manures. Keep a few old buckets of water

handy with a shovel full of pig, cow, and fowl manure thrown in each to dissolve for a time; also add a tablespoonful of sulphate of ammonia and the same quantity of superphosphate to each bucket. Then give each plant one pint of the liquid once a week. Keep the plot nicely cultivated, and there is no reason why they should not go along nicely and be fit for use during October. Some quick maturing varieties come on in less time; but plant early, as they will not do well if planted out in cold weather." (Secretary, Mr. T. Golder.)

LONGWOOD (Average annual rainfall, 37in. to 38in.).

February 28th.—Present: 12 members and seven visitors.

Members visited the property of Messrs. Coles and Wright, and inspected the poultry, plant, and equipment. Mrs. Coles provided tea. Mr. W. Hughes (President) presented Mr. J. B. Coles with a Life Membership Certificate of the Agricultural Bureau of South Australia. Mr. Coles has carried out the duties of Hon. Secretary for 21 years, and he has done much to further the work of the Longwood Branch. Mr. N. A. Frean gave an address on "The Possibilities of Subterranean Oil in the Hills." (Secretary, Mr. J. B. Coles.)

PORT ELLIOT (Average annual rainfall, 20.02in.).

March 24th.—Present: 14 members.

WOOL AND ITS PRODUCTS.—Mr. A. M. Fuller read part of the paper sent by the Department on this subject. The reader then said that in his opinion the severe drop from about £34 per bale to £7 for wool was not caused by over production, but by under consumption. It meant that people would rather go without new clothes than go hungry, and they were making suits, &c., last much longer than previously. Gold was at present held in United States of America, France, and Argentine, and unless redistribution was effected they could not hope for prosperity. The majority of the gold, as it was held by only three countries, restricted credit and reduced the purchasing power of the whole world. Mr. H. Welch thought that synthetic wool was one of the causes of the drop in prices, and Mr. Keen said that one of the reasons for the manufacture of this article was the high price of the real thing. Mr. Crompton said that wearing apparel had altered a good deal during the last few years, especially in the amount of wool, much more silk being used. Messrs. Smith, Deplidge, and White also spoke. (Secretary, Mr. A. Lowe.)

April 18th.—Present: 18 members.

SUBTERRANEAN CLOVER AND FAT LAMBS.—Under the heading, "My Experiences in the Port Elliot District and what they have led to," the following paper was read by Mr. P. James:—"Since taking up land in this district I have seen the highest prices received for wool ever experienced in the history of the State, but no great time elapsed before a very severe slump took place. Prior to being a landholder in the Port Elliot district, I occupied a property at Onkaparinga, and from my experiences there I was convinced that this district was one admirably suited to the growing of Subterranean clover, although I received little encouragement from my neighbors. Onkaparinga district 30 years ago was in a very similar condition to what Inman Valley was when I arrived. Thirty years ago the farmers of Onkaparinga depended a good deal on hay-growing, but had got to the stage when their crops were rather light; but since the district has grown heavy crops of Subterranean clover, it is marvellous what heavy crops of hay they can grow now, though it is a very limited area that is sown. Also, after a paddock had been cropped, it used to take very many years to get it grassed again, but where land had a good crop of clover previous to cultivation, it was very soon a good grass paddock again, and it will do the same for us. For instance, if we grow a crop of peas for lambs, we will have a good clover paddock again almost immediately, especially if following peas we grow barley. Onkaparinga has about an average of 6in. per year of rain more than Inman Valley, but the soil is not so clayey. Having seen what clover and super had done for the former district, I said it would do the same for this part. Both districts are also red and blue gum country. Having decided to grow clover, my next problem was to find the cheapest method of establishing it on the land already grassed with native grasses. My first experience was practically a failure—broadcasting seed on grass land. The second year I mixed seed with super and just scratched it in with a hoe-drill, and that was a great success, and I have been on that method ever since. Six years ago without super and clover the lambs reared were miserable, stunted little creatures, so I stopped breeding and went in for dry sheep until last season, when I changed over to about 300 ewes, with the result that though the first lambs were not dropped until August 8th, by January 1st 85 per cent. of the wether lambs had been sold for fats, and it was a pleasure to show them to any one that called. They were out of Mesino and Crossbred ewes by Corriedale rams. When I bred the miserable lambs six years ago a fat lamb was worth about 30s.; to-day about 10s. to 12s. I am quoting prices from November to January. Wool was about 36d.; to-day 1s. That is the revenue

side. Expenditure:—Land tax has more than doubled, car tax has nearly doubled, district council rates nearly doubled, and railway freight and income tax have risen. Are we doing the best with our land, which is carrying a good growth of clover, by keeping sheep and selling wool for 1s. a lb., and fat lambs for 10s. to 12s., or should we change over to dairying. Land that is suitable for fat lambs to a certain extent is very suitable for dairying." Mr. H. Welch said that Mr. James had made a wonderful difference in his farm since he purchased it. Mr. A. Fuller was of the opinion that the writer had some of the finest lambs in the district. As regards clover pasture, &c., he thought that the land should be broken up every seven or eight years, to improve the feed. Mr. White said they should not rely entirely on Subterranean clover, as it was an unbalanced ration, but add mixed grasses, such as the various ryes, &c. It was better to have a mixed farm than have only sheep. Mr. J. Crompton informed members that he had seen Subterranean clover established at "Stoneyfell" over 30 years ago. Talking on the present state of the markets, Mr. H. L. Smith said that the cost of production must come back so that the farmer could afford to use super. A discussion followed on "Pork," and Mr. James said that with the present low prices for store pigs, wheat, &c., pork could still be produced at a profit, in spite of the low prices obtained. Mr. Smith said that about 13 per cent. to 14 per cent. of the money received went in cartage and commission charges. (Secretary, Mr. A. Lowe.)

STRATHALBYN (Average annual rainfall, 19.43in.).

March 31st.—Present: 18 members.

The Ashbourne Branch gave the programme for the evening, the speakers being:—Mr. Horwood, "Licks for Sheep"; Mr. H. Pitt, "The Value of Scientific Research in Agriculture and Kindred Pursuits;" and Mr. C. Pitt, "Some Aspects of Potato Culture." Mr. Horwood in his remarks said there were quite a number of licks suitable for sheep, but many were too expensive for general use. Top-dressing of pasture was very beneficial to grazing for sheep. It was advisable to use a small quantity of molasses in all licks. The mixture was:—100lbs. ground rock phosphate, 100lbs. salt, and 6lbs. molasses. The speaker also touched on methods of feeding. Mr. H. Pitt spoke on the cost of running a farm, and said that experiments and demonstrations were being carried out to improve and lessen the cost of production, therefore the practical work done at Roseworthy College and Waite Research Institute could not be judged by a financial balance-sheet. The speaker read an article showing what was being done in New Zealand by feeding stock with ensilage. He also advocated the analyses of soils to find the plant foods in which they were deficient. Mr. C. Pitt tabled fine samples of potatoes taken from his property at Ashbourne. He said the most important thing in growing potatoes was selection of seed; it should be strong and healthy, and a change of seed was necessary. Treatment of seed:—Place the seed on wire-netting and do not be afraid of the sun doing harm. Sow plenty of fertiliser. The plants must have food, and if a good harvest is to be secured the proper foods for the plants must be there to obtain it. (Secretary, Mr. F. Allison.)

Summary of Meetings, &c.

Branch.	Date of Meeting.	Members Present.	Subject.	Secretary.
Brinkley ...	29/4/31	—	Address—Mr. A. Hilton	C. Pearson
Mt. Compass	21/4/31	—	Field Day and Address— Mr. H. B. Barlow	J. Black
Mt. Compass	7/5/31	76, including visitors	Address—Dr. A. M. Morgan	J. Black
Mt. Barker	6/5/31	—	Address—Mr. R. C. Scott	P. Wise
Mt. Pleasant	10/4/31	4	Formal	W. Smith
Mt. Pleasant	8/5/31	4	Discussion	W. Smith
Blackheath	7/5/31	10	Paper from <i>Journal of Agriculture</i>	E. Paech
Lenswood & Forest Range	27/4/31	15	Address—Officers of R.A.A.	B. Lawrence
Kangarilla ..	2/5/31	8 and 19 visitors	Address—Mr. H. Nicolle	T. Golder
Blackwood	11/5/31	12 and 7 visitors	Address—Mr. J. Bald....	R. Quinn
Scott's Bottom	2/5/31	5	Address—Mr. H. C. Pritchard	E. Atkinson, Cherry Gardens
Tweedvale ..	30/4/31	—	Cinema Lecture—Vacuum Oil Co.	B. Schapel

CROWN LANDS.

LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which is published half-yearly (in January and July). The list shows the areas, localities, prices, short general descriptions, &c., of the sections available, and the conditions under which they may be applied for.

Copies of the list may be obtained on application to the Director of Lands, Box 293A, Adelaide.

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open for application are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portions of a block if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey of the subdivision.

ADVANCES TO SETTLERS.

The administration of the various Acts dealing with advances to settlers has been committed to the State Bank of South Australia by the State Bank Act, 1925. All applications should be made to the Chairman, Board of Management, State Bank, Pirie Street, Adelaide.

R. S. RICHARDS, Commissioner of Crown Lands.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned :—
"First Aid to the Horse," by F. E. Place, B.V.Sc., M.R.C.V.S., &c. ; price, 3s. ; posted, 3s. 2d.
Journal of the Department of Agriculture, 5s. per annum in advance ; 1s. per single copy to residents in South Australia. Other places, 10s. per annum ; single copies, 2s. each.
 The bulletins and leaflets may be obtained by sending a 1d. stamp for postage.
 All communications must be addressed—Ed., "Journal of Agriculture," Box 901E, G.P.O., Adelaide.

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

CLOVER TROUBLES

in PASTURES.

Mr. R. Crowe, Export Superintendent of the Department of Agriculture, Victoria, emphasises the bad effect of excess clover on the keeping qualities of milk, cream, and butter in an article on "Butter Factory Management," extracts of which are published in the *Victorian Journal of Agriculture* for August, 1930. For those dairymen and lamb raisers who encounter bloat and kidney disease in stock and "clover taint" in milk it is essential to obtain more grass in proportion to clover in their pastures. Autumn is the best time to rectify the trouble, and the following system should prove satisfactory :

- 1.—Autumn Harrowing and Reseeding with Wimmera rye grass in low rainfall areas and perennial rye and cocksfoot under moister conditions.
- 2.—Application of Sulphate of Ammonia. $1\frac{1}{2}$ cwt. per acre in April or May after soil has been well saturated by Autumn rains.
- 3.—July Application of Sulphate of Ammonia 1 to $1\frac{1}{2}$ cwt. per acre. In addition to improving the grass-clover balance the use of sulphate of ammonia will provide valuable grass growth during the Winter and early Spring months.

For further particulars apply—

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THE JOURNAL

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OF SOUTH AUSTRALIA.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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S. R. WHITFORD.
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences of Branches of the Agricultural Bureau are being arranged as follows:—

Murray Mallee (West), at Karoonda, Tuesday, August 11th. (Secretary, Mr. B. Harrold.)

Pinnaroo Lines, at Pinnaroo, Thursday, August 13th. (Secretary, Mr. H. L. Badman.)

Southern, at Langhorne's Creek, Thursday, August 20th. (Secretary, Mr. P. H. Nurse.)

Hills, at Mount Pleasant, Thursday, August 27th. (Secretary, Mr. D. Stow Smith.)

The above Conferences will commence at 10.30 a.m. in each case. Papers and questions for Conferences should be sent to the General Secretary, Agricultural Bureau, about a fortnight prior to the respective dates mentioned.

Forty-Second Annual Congress.

The Forty-Second Annual Congress of the Agricultural Bureau will be held in the Way Hall, Franklin Street, on September 14th, 15th, and 16th.

His Excellency the Governor has intimated that he will be pleased to deliver the opening address on September 14th at 8 p.m. At this session the Minister of Agriculture (Hon. S. R. Whitford, M.L.C.), and the Chairman of the Advisory Board of Agriculture will also address the delegates. At a recent meeting of the Agenda Committee, it was decided to request Dr. A. E. V. Richardson (Director of Waite Agricultural Research Institute), Messrs. W. R. Birks (Principal Roseworthy Agricultural College), H. Showell (Renmark), H. B. Barlow (Chief Dairy Instructor), and C. F. Anderson (Pottery Expert) to give special addresses at different sessions.

Branches have been asked to submit papers, resolutions, questions, and subjects for discussion not later than August 7th, when the Congress Committee will meet to compile the agenda. A draft copy of the agenda will then be submitted to Branches to give members an opportunity of discussing the items with delegates.

Bureau members who may be in Adelaide during Show Week are reminded that the Congress is not held exclusively for those who are appointed as delegates. The meetings are open to all members, who may also bring friends with them. When dealing with resolutions, &c., only delegates will be allowed to vote.

Delegates and members attending the opening session on Monday night are requested to take their seats at 7.45 p.m.

A visit will be made to the Waite Agricultural Research Institute on the morning of Thursday, September 17th, when visitors will have an opportunity of viewing the experimental work upon which Dr. Richardson will address the Congress on the Wednesday night.

Special sessions will be held for delegates and members of Women's Branches.

Imperial Fruit Show.

The Imperial Fruit Show will be held this year at the City Exhibition Hall, Manchester, from October 30th until November 7th.

Now in its eleventh year, the Imperial Fruit Show is not only a commercial fruit show, but also a popular public exhibition. Its purpose is not only to promote better methods of cultivation, packing, grading, and marketing of Home and Empire grown fruits—fresh, canned and dried—but also to show the English public the quality and variety produced within the Empire boundaries.

The show is held in two sections, one in the spring and the other in the autumn. The spring section, specially arranged to meet seasonal conditions in South Africa, Australia, and New Zealand, has just concluded, whereat Australia secured the major number of awards in both the culinary and dessert apple classes. The points awarded for the culinary and dessert apples in the two main classes will be compared and judged with the Empire apples from the northern hemisphere exhibited at Manchester in October next.

The various sections in which Dominion growers may compete are:—

Section V.—Overseas Section (Citrus)—Open to growers, packing stations, associations of growers and exporters in any part of the British Empire (five classes).

Section VII.—Canned Produce Section—Open to canners in any part of the British Empire, but all produce shown must have been grown and canned in the British Empire (22 classes).

Section VIII.—Dried Fruit Section—Open to producers and packers in any part of the British Empire. All fruit must have been grown in the British Empire (10 classes).

Special provision has also been made for a Honey Section, which has been introduced for the first time this year. This section is composed of two divisions, one of which is open to the United Kingdom only, and the other, which is confined to exhibits from the Dominions and Colonies. In the latter division competitors may enter for the following classes, viz.:—

(a) One market case of honey in tins.

(b) Three jars of granulated honey, gross weight to approximate 3lbs.

(c) Three jars of clear honey, gross weight to approximate 3lbs.

Entry fees are 5s. for each exhibit in Class (a) and 2s. for each exhibit in Classes (b) and (c). Prizes of £3 for first, £2 for second, and £1 for third will be awarded in each class.

Fruitgrowers and others interested may obtain entry forms and copy of the schedule containing full information regarding the classes and other particulars from the Secretary, Department of Markets, 527, Collins Street, Melbourne.

Grape Skins for Fertilising Material.

The Greenock Branch of the Agricultural Bureau submitted samples of fresh and decayed grape skins and asked for information as to the fertilising value for (1) orchards and vineyards, (2) cereal crops, and (3) pastures. Prof. A. J. Perkins, Director of Agriculture, in reply, says:—

The samples were submitted to Dr. Hargreaves, Director of Chemistry, for analyses, with the following results:—

	Grape Skins.		Farmyard Manure.	
	Fresh. Per cent.	Decayed. Per cent.	Fresh. Per cent.	Rotted. Per cent.
Moisture	19.8	17.1	75	75
Nitrogen	1.29	1.05	0.39	0.50
Lime	0.55	0.98	0.49	0.70
Phosphoric acid	0.44	0.27	0.18	0.26
Potash	2.19	1.56	0.45	0.63

Relative to the above analyses, I wish to state that everything depends on the accuracy with which the samples were taken, and it seems to me that from the point of view of a normal sample, the percentage of moisture is very low, and it must be realised that any remarks that may be made in reference to this particular sample are naturally influenced by the low moisture content indicated. Should the bulk have a higher proportion of moisture, the statements made would no longer hold good.

You will notice that side by side with the figures for grape skins I have shown normal analysis of both fresh and rotted farmyard manure. I have done this because it is essential that a manure like grape skins should be compared with one of this type. The

main difference between the two, that is to say, between grape skins and farmyard manure, appears to be the high proportion of moisture present in the latter, and on this basis farmyard manure is less rich in mineral constituents than grape skins.

I notice your statement to the effect that the orchards and vineyards of your district are well supplied with humus, resulting from green grass which is annually ploughed under. In this connection I am personally inclined to doubt the value of this statement. You perhaps overlook the fact that well-tilled orchards and vineyards are practically subject to a treatment which corresponds very largely to continuous bare fallow, and one of the results of well-tilled bare fallow is to break up and destroy the organic matter, the mineral constituents of which become then available as plant food. It is impossible, therefore, that a treatment of this kind going on from year to year can have any other result than the gradual wasting of whatever organic matter may have been originally present in the soil, and the winter burial of the few weeds that may grow in these orchards and vineyards will be insufficient to make good this loss. Hence, in my opinion, the dressing of grape skins, like a dressing of farmyard manure, has one important connection—that of bringing new organic matter to the soil. As to the mineral constituents, they can, of course, be compared to those present in common artificial manures. At the same time, it should be carefully borne in mind that, whereas the mineral constituents of artificial manures are in an easily available form to plants, the same constituents in grape skins cannot become available until brought under the influence of a succession of soil bacteria, and, although eventually the plants will get the full benefit of them, it is only after a succession of years. The figures that I am about to give, therefore, should be borne in mind in this particular connection.

Nitrogen.—In the fresh skins we see 1.29 per cent. of nitrogen and in the decayed 1.05 per cent. If we assume a dressing of grape skins corresponding to that usually given of farmyard manure, namely, 10 tons per acre, this would mean that the amount of nitrogen present in the 10 tons of fresh grape skins would correspond to that present in nearly 13 cwt. of sulphate of ammonia, and in 10 tons of decayed skins to that present in 10½ cwt. of sulphate of ammonia. Please remember, however, that if the moisture present is higher than that given for the sample these figures would be correspondingly lower.

Lime.—The fresh skins are shown to contain 0.55 per cent. and the decayed skins 0.98 per cent. These figures mean that the lime present in 10 tons of fresh skins would be roughly 1 cwt. and that present in the decayed skins roughly 2 cwt.

Phosphoric Acid.—The fresh skins are said to contain 0.44 per cent. phosphoric acid and the decayed skins 0.27 per cent. These figures mean that 10 tons of fresh skins would contain phosphoric acid corresponding to that present in 4½ cwt. of 45 per cent. superphosphate, and 10 tons of decayed skins to that present in about 2½ cwt. of 45 per cent. superphosphate.

Potash.—Fresh skins are said to contain 2.19 per cent. potash and the decayed skins 1.56 per cent. These figures mean that 10 tons of fresh skins would contain potash corresponding to 8½ cwt. of commercial sulphate of potash and the decayed skins at 6½ cwt. of commercial sulphate of potash.

I should, perhaps, have stated earlier that naturally the composition of decayed skins in comparison with the fresh skins will depend a good deal on the length of time the processes of decay have been at work and the manner in which the skins may have been kept, that is to say, whether exposed to the weather or not.

Finally, it is asked that a statement should be given of the value of those skins for orchards and vineyards, for cereals, and for pastures. Personally, I am of the opinion that the most useful position in which they could be placed would be on orchards and vineyards. Under our conditions of climate, they would have comparatively little value for cereals, chiefly because of the slow progress involved in the availability of the mineral constituents. Young cereal plants require to find within their immediate reach all the mineral food necessary to their early development, and among these chiefly



Illustration shows a Fordson operating a heavy scoop on a Victorian dam construction job. One-man scoops are also available.



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phosphoric acid, lime, and nitrates, and even if this material were ploughed under at fallowing time, it is doubtful whether it would have reached the stage of decay to make it of much use to young growing cereals.

However, if land to be sown to cereals were lacking in organic matter, a dressing of these skins would be useful if applied at fallowing time.

I think that if top dressed for pastures their value would be very largely wasted.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of:—

"A Systematic Census of the Plants Occurring in Western Australia," by Charles A. Gardner. Price, £1.

"Illawarra Milking Shorthorn Herd Book," Vol. II., 1929.

"Report of the Proceedings of the Fourth World's Poultry Congress, London." Price, 10s. 6d. net.

"Fruit Supplies in 1930—Empire Marketing Board Report, No. 38." Price, 1s. net.

"Nineteenth Annual Report, Department of Agriculture, Scotland, 1930." Price, 4s. net.

"Report on the Present Position and Future Prospects of Citrus Industry in Australia, 1930."

"Economic Aspects of Mixed Farming in the Murray Valley, 1930."

HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. GEO. QUINN, Chief Horticultural Instructor.]

Fruiting of the Granny Smith Apple.

"Can the Department of Agriculture supply me with any information concerning the fruiting of the Granny Smith apple?" ("T. H. G.," Beaconsfield). Replying to the question, Mr. Geo. Quinn (Chief Horticultural Instructor), says whilst the Granny Smith is being much more favored than formerly, nearly all of the trees met with in our commercially conducted orchards have barely reached the fruiting stage.

Our experience in the State Experiment Orchard at Blackwood has been that the mature type trees in our apple collection has fruited quite well. It, of course, is growing amongst a hillside block, each tree of which consists of a different variety, so we do not know which sort may be influencing it in the direction of cross-pollination.

In another portion of the Orchard in a Bitter Pit stock trial block we worked over a good number of mature trees of Shockley to Granny Smith about five to six years ago—grafting on to the stumped main arms. These trees are in good land and have grown tremendously. They are mostly on Spy or other blight-proof roots, and some have an intervening stem of another sort—Rome Beauty or Dunn's worked on the Spy, etc. These combinations do not seem to have retarded their growth or fruitfulness in any way. These trees have cropped quite well also, but they grow in a block in each short row of which there is a mixture of sorts consisting of Cleopatra, Jonathan, Spitzenburg, Baldwin, and Shockley, so that here again the question of cross-pollination is befogged.

In regard to pruning, we have treated the old type tree to only moderate pruning, and the young, vigorous growth from the grafts, after the first couple of seasons when reshaping the trees, was uppermost in our minds, we have given the trees considerable latitude. Whilst the leading shoots have been topped, the laterals have only been thinned out and rarely shortened at all.

This latter procedure is, I think, accountable for the good crops collected thus far.

DAIRYING INQUIRIES.

[Reply supplied by Mr. H. B. BARLOW, Chief Dairy Instructor.]

Formalin-pickled Barley for Pigs.

"Would the feeding of formalin-pickled barley be injurious to pigs?" (Wasleys Agricultural Bureau). Reply—"Provided the barley is not just freshly pickled, and has dried out, it is not injurious to pigs."

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"W. H. C.," Parrakie, has Jersey cow 7 years old unable to get in calf, and (2) horse, when not feeding, stands with head down nearly touching the ground and moves neck from side to side. Replies—(1) *Barren Cow*.—In view of the length of time the animal has gone "empty," despite repeated attempts to breed her, it is very doubtful if you will succeed in getting her in calf again now. The only treatment you can attempt is to douche the vaginal passages out once daily for a fortnight (starting immediately after the next time she is in season) with a gallon of lukewarm Condyl's solution (strength, $\frac{1}{2}$ teaspoonful crystals to 1 gall. water). Then for a further week, give daily douches of 1 gall. lukewarm salt solution (strength, 1 teaspoonful salt to each pint of water). Then when the cow comes "in season" again, give a final douching with a solution of baking soda (same strength as the salt solution). This douche should be given half hour prior to service by the bull. (2) *Horse*.—There is nothing very "diagnostic" in the symptoms you describe. Have her teeth examined, there may be a diseased tooth that requires attention. A drench of raw linseed oil, $1\frac{1}{2}$ pints; turpentine, 4 tablespoonfuls, should be given after 16-24 hours starvation, and the animal subsequently given a tablespoonful of liquor arsenicalis in damped feed night and morning for a fortnight.

"T. O. M.," Borrika, reports mare served end of last September, joints very stiff, and during past two weeks milk has been flowing from the udder. Reply—The mare should not require any special treatment beyond seeing to it that she gets regular exercise and is not allowed to get into too fat condition. She can, with distinct advantage, be kept in moderate slow work, even right up to within a day or two of foaling. This will provide the first of the two above requirements, and will also, to

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some extent, help to obviate the latter. Her food ration should be regulated so that suitable condition is maintained, and the provision of a certain proportion of green feed in it is essential, more especially towards the latter stages of her pregnancy. Just before and for a short time after foaling her feed ration should be somewhat curtailed and be of a laxative nature.

"H. A. L.," *Wirrellyerna*, asks are ewes subject to mammitis. Reply—Yes. The udders of all breeding ewes should be examined, and any showing signs of mammitis should be culled.

"C. F. Z.," *Wallala*, reports horse with piece of chaff in the eye. Reply—Treatment will depend upon how long the husk had been in the eye. If seen early, irrigation by the squirting in of a warm solution of boracic acid may dislodge it sufficiently to be able to remove with a piece of cotton wool tied around the end of a pen handle. If it has been in position for a day or so and a white membrane commences to form around the husk, a solution of cocaine should be obtained from a doctor and instilled into the eye and left for five minutes. Then the animal will open the eye and allow the husk to be removed with a small pair of forceps, or swab of cotton wool. For two or three days after removal bathe the eye with a strong solution of boracic acid and place a guard made of clean bagging over the eye to keep out the light.

"L. B. S.," *Halidon*, reports aged pony which periodically breaks out in lumps, which do not discharge, but disappear later, leaving a dirty white scaly appearance. Reply—The cause is probably dietetic, especially if pony is kept in fat condition. When feeding dry food, cut down the grain as much as possible, substitute bran and give one tablespoonful of baking soda in feed night and morning. Twice a week give about $\frac{1}{2}$ pint of raw linseed oil mixed in the chaff to keep bowels in a laxative state.

"G. E. S.," *Cowell*, has (1) sheep licking burnt up straw; (2) question of procuring laudanum when a chemist is 100 miles away. Replies—(1) Sheep licking burnt straw would possibly be a sign of a mineral deficiency, and it is most likely to be phosphorus, calcium, sodium chloride, or a deficiency in all three. Such deficiencies can be made good by giving any of the following mineral supplements in the form of a lick, which can be placed out in kerosene tins cut longways:—1. Ground rock phosphate, common salt, equal parts—mix well. 2. Superphosphate, common salt, equal parts—mix well. (2) This question was referred to Messrs. F. H. Faulding & Co., Ltd., wholesale chemists, Adelaide, who advised that provided there is no doctor or chemist within 20 miles of him, a storekeeper can obtain supplies. If you have a doctor within 20 miles of the local store you could probably obtain supplies from him when required, but if the local storekeeper is 20 miles from a doctor, he can obtain the medicament from Messrs. Faulding & Co., Ltd., Adelaide.

"A. J. O.," *Ceduna*, has mare in fat condition with an irritation affecting the legs. Reply—The symptoms described suggest irritation by mites, which infest grasses, &c., at this time of the year. Try the following treatment:—Apply a mixture of raw linseed oil (1 pint) and lysol (2 tablespoonfuls) to the legs, rubbing it on with a brush after shaking mixture well. Repeat two or three times. If feeding hay of chaff give 1 tablespoonful of baking soda mixed with the feed twice a day for a week. Reduce mare's condition and give green feed, if available.

"Mrs. A. C. T.," *Cherry Gardens*, asks treatment of a cow with boils on the udder. Reply—Wash the udder thoroughly with soap and warm water and dry. Then clip to remove all long hair on under part of udder and around site of the boils. Paint the boils with the following solution after every milking:—Take tincture of iodine, Friar's balsam, glycerine, of each 2ozs.; mix and shake well before applying. The abscesses, when opened or when they break, should be syringed out with a solution of washing soda (1 tablespoonful to the pint of water) to get rid of all discharge, and a plug of cotton wool soaked in the iodine solution inserted once or twice to get rid of the discharge remaining.

"C. H. P.," Brinkley, reports draught mare with leg swollen from hock to fetlock.
Reply—The condition is known as "lymphangitis," and is brought about by various causes. It often affects horses with a sluggish temperament, or horses on a rich diet and doing very little work, or horses coming in from the paddock and put on to hard feed, and it often tends to become chronic. *Treatment.*—Give the horse 8ozs. of Glaubers salts dissolved in a pint of water as a drench, apply hot fomentations of water to the affected leg, give plenty of exercise, reduce the grain in the ration (substituting bran for it) and give plenty of green feed. Smaller doses of Glauber salts (1oz.) should be given in the dry feed daily for six days.

"H. B. S.," Wilmington, has heifer suffering acutely from "Redwater." Reply—This condition in the case mentioned is probably due to a deficiency in the diet, and similar cases occurred in other parts of the State when drought conditions were prevailing. You do not give any particulars as to the bodily condition of the heifer or her previous history. The following treatment is recommended. Give the following drench:—Epsom salts, 1lb.; ginger, 2ozs.; treacle, $\frac{1}{2}$ lb.; water, 2 pints. Bring her in from the paddock and feed on chaff, bran, and crushed oats twice a day in addition to any grass available. Mix in the feed night and morning 1 $\frac{1}{2}$ ozs. of the following mixture:—Superphosphate, 1lb.; common salt, 1lb.; powdered nux vomica, 4ozs.; powdered ammonium carbonate, 4ozs. Mix and make mixture. If weather is cold, keep heifer rugged.

"H. B. C.," Narridy, requests cure for itch on legs of horses. Reply—This complaint is due to the irritation caused by mites, which are present in pastures, &c., at this time of the year. The application of oily dressings containing a little lysol, creosote, once or twice is generally effective. Mineral oils should not be used, as they often cause irritation. Any comparatively cheap vegetable oil is recommended, such as raw linseed or cotton seed oil mixed in the proportion of 1 pint with 2 tablespoonfuls of lysol.

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## PRESENT AND FUTURE ECONOMIC POSITION OF FARMERS.

[By ARTHUR J. PERKINS, Director of Agriculture.]

(Address at the Conference of Upper North Branches of the Agricultural Bureau  
at Willowie, July 15th, 1931.)

### INTRODUCTORY.

I have been asked to address you on the position of the farmer—present and future—particularly in relation to personal finance. It is fairly obvious that such a request must have been prompted by the difficulties that have beset you as a result of the calamitous fall in the price of Wheat, coming, unfortunately, in immediate succession to an unusually prolonged period of unfavorable seasons. On the latter point at least, let me congratulate you on the very fine prospects of the current season, and express the hope that we have now, for a period of years at all events, definitely broken with droughts and all their distressing consequences.

The more recent cause of your discomforts—the fall in price of Wheat—cannot, however, be dismissed so readily. This unfortunate decline would appear to have been brought about by two main economic facts, namely:—

- (1) World-wide Financial depression which, by curtailing the purchasing power of consumers, has led to a fall in prices of all commodities alike; and
- (2) World over-production of Wheat dating back to 1926.

With the latter point I dealt fully in my address to Congress last year, and I shall therefore content myself with reminding you that, relatively to pre-war World consumption, over-production of Wheat since 1926 has been at the mean annual rate of approximately 500 million Bushels per annum. Now, normally over-production of a commodity of the universality of Wheat will always right itself fairly readily if left to itself. Over-production in such circumstances involves low prices, and low prices lead to increased consumption on the one hand, and on the other tend to drive into other lines of activity those who find the production of the commodity concerned least profitable; and this combination leads usually to reduced production coupled with slowly improving prices until a state of approximate equilibrium is reached. Unfortunately, when the fact of World Wheat over-production began to be realised the solution of the trouble was not left to the play of normal economic factors, but frantic efforts were made to stem the tide of gradually falling prices by withholding vast quantities of wheat from the markets of the world. In so far as the *temporary* maintenance of abnormally inflated post-war prices was concerned these efforts were no doubt successful, but, eventually, to the Wheat-growers of the World these efforts did great disservice by holding in check World Wheat consumption at a time when the purchasing powers of its chief consumers were at a very low ebb, and driving the latter into the use of Rye and other cheaper surrogates, which at some cost must now be systematically displaced. But from the very outset the end was well in sight; this artificial bolstering up of prices cast a discreet veil over realities, and for the time being did nothing towards checking over-production. Eventually, however, after a few ineffective struggles, stored Wheat had to be released, and led to the spectacular drop in prices that we know of, the like of which has not been paralleled in the last hundred years.

There is perhaps some compensation for wallowing at the bottom of a trough. The position may not be very comfortable, but there is consolation in the knowledge that when in the fulness of time a change does set in, it can be in one direction only, and that is upwards, and the only anxiety is whether length of time may not get the better of native endurance. Of one thing, we may in the meanwhile feel positive, and that



is that the continuance of abnormally low prices is steadily, if slowly, working in the farmer's favor. It is, on the one hand, promoting increased World consumption of Wheat, and on the other, the gradual disappearance of unprofitable Wheat areas, and eventually such a combination can have but one effect, namely, progressively improving Wheat prices. If, in this connection, I may be allowed a purely personal expression of opinion—and you must take it for no more than it is worth—I shall say that we have good reason to anticipate better Wheat prices in 1932 than those current in 1931, but that the extent of this improvement in prices will be governed by the World financial position rather than by the available net World supplies of exportable Wheat.

#### WHEAT AND THE SOUTH AUSTRALIAN FARMER.

All this is by way of introduction to an examination of the position of the South Australian farmer, both in the present and in the future. He is, as you know, very firmly rivetted to Wheat as the main line of his activities. The whole of his farming practices have been directed towards the maximum production of Wheat that the seasons and his means permitted of; and when Live Stock operations have been associated with Wheat, it has usually been with an eye to improved production of the latter, and even when a scrub block has been taken up it is usually with the assistance of Wheat that it has been economically reclaimed for whatever ultimate purpose it may have been required. Personally, I can see no alternative to Wheat in South Australia, particularly in its Northern Agricultural Areas, except complete reversion to Sheep, which would be tantamount to putting back the clock of progress in a State essentially built upon agricultural development. No, others may and will withdraw partially or wholly from Wheat, but South Australians simply cannot do so.

In this connection I shall probably be told that at current prices farmers are receiving for Wheat considerably less than costs of production, and in such circumstances how can they be expected to continue growing Wheat? Because there is no alternative; because low prices and poor seasons will be succeeded by better ones; and finally because the tenacity and grit of the farmer is such that he will not give up his farm until he is forcibly driven off it.

Whilst I am prepared to admit to the personal opinion that present-day prices determined upon a strict accountancy basis do not and cannot pay costs of production of Wheat on the average farm, nevertheless, I recognise the difficulty of strict proof in the matter. I could no doubt put forward towards that end the data collected at Turretfield Demonstration Farm over the past nine years, but these data unfortunately do not correspond to those of the average South Australian Farm, and could not be accepted as adequate evidence. On this farm there is a paid Manager, and all Labor incurred is met by Cash payments, whereas on the average farm the owner is working Manager, and the place of hired labor is taken very largely by unpaid family Labor. But if in order to meet the position we were to place an artificial value on the owner's work and on that of his family, absence of adequate daily records would usually render impossible a fair distribution of the value of this Labor between Wheat and other farm activities, such as Sheep, Cows, other Crops, &c., and the same difficulty would apply to some extent to the distribution of the value of team work and of the wear and tear of implements and tools.

But even if notwithstanding these difficulties it were possible to arrive at an acceptable determination of costs of production on a single farm and in a single season this would not take us very far: we should still have between 12,000 and 13,000 Wheatgrowers on each one of whose farms costs per Bushel would vary not only one with the other, but also on one and the same farm from field to field and from season to season. In other words, quality of land, Capital investments, strictly local seasonal conditions of the year, prevalence of disease or accidents, managerial and technical skill, other personal



idiosyncrasies, and in some measure "luck," all would in varying degree have their say in the determination of mean yields per acre in any one year, and as to whether corresponding mean costs per acre would be relatively high or relatively low; and as to whether the farmer would be adequately rewarded for his labor by Wheat prices current at the time.

#### A NORTHERN FARMER'S ESTIMATE OF COSTS OF PRODUCTION OF WHEAT.

And since we cannot hope to discuss the question from the standpoint of a true State mean, I propose falling back upon second best and availing myself of a very fair estimate of the position which was submitted by Mr. W. Crawford, of Mannanarie, at the 1926 Conference of Mid-Northern Branches, and which was published subsequently in full in the May, 1926, number of the *Journal of Agriculture*.

Mr. Crawford told us that his statement had been based upon 10 years personal experience of an 800 acre farm with an 18in. rainfall. This farm carried annually 350 acres of Wheat sown upon Bare Fallow, of which 80 acres were cut for Hay. The Wheat had averaged 24bush. to the acre over ten years. A flock of 150 Ewes had been associated with Cropping operations.

From data supplied by Mr. Crawford the Capital invested in his 800 acre farm admits of the following summarised statement:—

|                            | Total. |        | Per Acre. |    |    |    | Per Cent. |    |
|----------------------------|--------|--------|-----------|----|----|----|-----------|----|
|                            | £      | £      | £         | s. | d. | £  | s.        | d. |
| Land and Improvements ..   | —      | 9,600  | —         | —  | —  | 12 | 0         | 0  |
| Implements and Tools ....  | 783    | —      | 0         | 19 | 1  | —  | 6         | 4  |
| Farm Vehicles .....        | 180    | —      | 0         | 4  | 6  | —  | 1         | 5  |
| Personal Vehicles .....    | 220    | —      | 0         | 5  | 6  | —  | 1         | 9  |
| Harness .....              | 116    | —      | 0         | 2  | 11 | —  | 1         | 0  |
| Stationary Engine .....    | 75     | —      | 0         | 1  | 11 | —  | 0         | 6  |
| Working Horses .....       | 260    | —      | 0         | 6  | 6  | —  | 2         | 2  |
| Farming Plant .....        | —      | 1,614  | —         | —  | —  | 2  | 0         | 5  |
| Sheep .....                | —      | 225    | —         | —  | —  | 0  | 5         | 8  |
| Cash requirements .....    | —      | 400    | —         | —  | —  | 0  | 10        | 0  |
| Total Capital .....        | —      | 11,839 | —         | —  | —  | 14 | 16        | 1  |
| Interest on Capital at 6 % | —      | 710    | —         | —  | —  | 0  | 17        | 9  |

It will be observed that in the above statement the value of Land and Improvements—£9,600—represents more than four-fifths of the Capital invested, and corresponds to yearly interest dues of £576, or 14s. 5d. per acre per annum. This sum which must be met yearly from Farm revenues, equals the value of 1,536 bags of Wheat at 2s. 6d. a bushel; or of 1,280 bags at 3s.; or again, of 1,097 bags at 3s. 6d. Mr. Crawford told us that for a period of ten years his mean returns had been at the rate of eight bags to the acre from 270 acres reaped for Wheat; hence, with Wheat at 2s. 6d. a bushel, for every 100 bags reaped 71 bags would have been required to meet interest dues on Land and Improvement alone; with Wheat at 3s. a bushel 59 bags; and with Wheat at 3s. 6d. a Bushel 51 Bags. Nor should it be forgotten that additional provision would have to be made for interest dues on Stock and Plant. Hence, it would appear to be overwhelmingly clear that farmers who purchase high price land are treading upon very thin ice, and that no such purchases should be effected unless the farmer is amply satisfied that they represent a reasonable business proposition. Moreover, in this connection, it is not the boom prices of abnormal years that should be the determining factors, but the mean prices of the immediately preceding quarter of a century.

It can, of course, be objected that Mr. Crawford's farm, although perhaps typical of his immediate district, is after all not typical of the North as a whole. For purposes of comparison, therefore, I have shown overleaf corresponding figures for the mean of 23 Northern No-Tractor Farms collected for me by your District Agricultural Instructor, Mr. E. L. Orchard.



*Mean Capital Invested in 23 Northern Areas.*

Mean Area = 869 acres. Mean Area Cropped = 275 acres.

|                              | Total. |       | Per Acre. |         | Per Cent. |       |
|------------------------------|--------|-------|-----------|---------|-----------|-------|
|                              | £      | £     | £ s. d.   | £ s. d. |           |       |
| Land and Improvements . . .  | —      | 6,737 | —         | 7 15 1  | —         | 81.3  |
| Implements and Tools . . .   | 346    | —     | 0 8 0     | —       | 4.2       | —     |
| Farm Vehicles . . . . .      | 77     | —     | 0 1 9     | —       | 0.9       | —     |
| Personal Vehicles . . . . .  | 169    | —     | 0 3 11    | —       | 2.0       | —     |
| Harness . . . . .            | 38     | —     | 0 0 10    | —       | 0.5       | —     |
| Stationary Engine . . . . .  | 44     | —     | 0 1 0     | —       | 0.5       | —     |
| Working Horses . . . . .     | 217    | —     | 0 5 0     | —       | 2.6       | —     |
| <hr/>                        |        |       |           |         |           |       |
| Farming Plant . . . . .      | —      | 891   | —         | 1 0 6   | —         | 10.7  |
| Sheep . . . . .              | 174    | —     | 0 4 0     | —       | 2.1       | —     |
| Cattle . . . . .             | 66     | —     | 0 1 6     | —       | 0.8       | —     |
| Pigs . . . . .               | 8      | —     | 0 0 2     | —       | 0.1       | —     |
| Poultry . . . . .            | 17     | —     | 0 0 5     | —       | 0.2       | —     |
| <hr/>                        |        |       |           |         |           |       |
| Revenue Livestock . . .      | —      | 265   | —         | 0 6 1   | —         | 3.2   |
| Cash Requirements . . .      | —      | 400   | —         | 0 9 2   | —         | 4.8   |
| <hr/>                        |        |       |           |         |           |       |
| Total Capital . . . . .      | —      | 8,293 | —         | 9 10 10 | —         | 100.0 |
| <hr/>                        |        |       |           |         |           |       |
| Interest on capital, at 6% . | —      | £498  | —         | 0 11 5  | —         | —     |

It will be observed that whilst the area of the average Northern Farm—869 acres—is slightly greater—8.6 per cent.—than that of Mr. Crawford's farm, the mean area under crop—275 acres—is appreciably lower—21.4 per cent. Similarly, the value of Land and Improvements per acre—£7 15s. 1d.—is 35.4 per cent. lower; the value of Stock and Plant per acre—£1 6s. 7d.—is 42.3 per cent. lower; and the value of total interest on Capital—£498—is approximately 30 per cent. lower. It should be added that for purposes of comparison I have adopted Mr. Crawford's figure of £400 to meet current cash outgoings.

The position of the average farm would therefore appear to be more favorable than that of Mr. Crawford's farm, but for the fact that smaller cropping areas, coupled with reduced mean yields per acre, would tend to neutralise the advantage of reduced interest charges.

Interest charges on Land and Improvements would be equivalent to the value of 1,011 Bags of Wheat at 2s. 6d. a Bushel; or to 4.4 Bags per acre from 230 acres reaped for grain. Corresponding figures with Wheat at 3s. would be 898 Bags and 3.9 Bags respectively; and with Wheat at 3s. 6d., 770 Bags and 3.3 Bags respectively.

Finally, I have summarised below the data upon which Mr. Crawford determined his mean costs of growing a 24-Bushel crop of Wheat.

|                                           | Mr. Crawford. |             | Turretfield.<br>Mean of Eight Seasons<br>for 19½ bush. Crop. |
|-------------------------------------------|---------------|-------------|--------------------------------------------------------------|
|                                           | Total.        | Per Bushel. |                                                              |
|                                           | £             | s. d.       | s. d.                                                        |
| Interest on Capital . . . . .             | 710           |             |                                                              |
| Depreciation on Capital . . . . .         | 102           |             |                                                              |
| Purchase of Material . . . . .            | 230           |             |                                                              |
| Management and Labor . . . . .            | 560           |             |                                                              |
| All other costs . . . . .                 | 437           |             |                                                              |
| <hr/>                                     |               |             |                                                              |
| Gross total costs . . . . .               | 2,039         |             |                                                              |
| Less Revenue from Hay and Sheep . . . . . | 570           |             |                                                              |
| <hr/>                                     |               |             |                                                              |
| Net costs . . . . .                       | 1,469         | 4 6         | 4 10                                                         |



From this table it will be observed that Mr. Crawford has endeavored to get round the difficulty of discriminating between costs incurred on behalf of Wheat, on the one hand, and those incurred on behalf of Hay and Sheep, on the other. He has assumed that Wheat-growing is preponderantly his major farm operation, and that Hay and Sheep do no more than contribute towards its success. In the circumstances, all farming costs have been charged against Wheat, and Revenue from Hay and Sheep have been deducted from Gross Costs, the difference being taken to represent Net Costs of growing Wheat. Such a practice is probably justifiable, in the absence of adequate data; but it must not be overlooked that it does not take into account that both Hay and Sheep taken by themselves might, according to circumstances, prove profitable or unprofitable, and as such introduce an artificial element in net cost per bushel of Wheat, namely, 4s. 6d.

I shall offer one other criticism on Mr. Crawford's statement, and that is that the allowance for Depreciation on Capital items—£102—is, in my opinion, inadequate; £240 would probably be nearer the mark, and if adopted would have the effect of approximately raising Mr. Crawford's Net Costs to the Turretfield mean figure of 4s. 10d. per Bushel.

It will be recalled that Mr. Crawford's statement is based upon a farm on which Land and Improvements were assessed at £12 an acre. I have already referred to the danger of high-priced land: let me point out here that if the land in question had been valued at £6 instead of £12, Mr. Crawford's costs per Bushel would have been reduced to 3s. 8d., a figure which we may have to accept as a normal mean in the immediate future.

#### THE PRESENT POSITION OF FARMERS.

Now, whilst neither Mr. Crawford's estimate of costs of production nor actual costs at the Turretfield Demonstration Farm can be accepted as typical of the State as a whole, bitter experience, if not accounts, have driven home to us the fact that 2s. 6d. a bushel cannot possibly cover normal costs of production of Wheat anywhere in South Australia. In this connection, although somewhat loath to do so, I shall state that in the past when times were more normal, I have not hesitated to insist that farmers, who were engaged in the great national undertaking of growing Wheat, were at the very least entitled to a return of their costs of production, if not to something better in the shape of Net Profits. To-day, unfortunately, conditions are no longer normal; not wheat-growers only, but the great majority of primary producers of the Commonwealth is not realising costs of production from prices offering; even highly protected manufacturers find themselves in corresponding difficulties. Nor is the plight of importers and professional men generally appreciably better; but, worst of all, an army of unemployed is tramping the streets of our Cities in dejected idleness instead of contributing to the development of the Commonwealth. Our mistakes as a community are no doubt partly to blame for this distressing state of affairs; but the main cause—World-wide depression and poverty, following on the wastage of World War—cannot surely be laid at our doors. In the circumstances I feel confident that you will all agree with me that the present is not the time to haggle over costs of production, but rather to thank God that unlike hundreds of thousands of their fellow-citizens, primary producers are at least in continuous employment, however unremunerative such employment may for the moment happen to be; and to glory in the knowledge that in a time of grave national emergency the ultimate rehabilitation of the affairs of the community is dependent very largely upon your grit, intelligence, and untiring efforts. But I have no need to labor this point; the Wheat-growers of South Australia have already shown in most effective manner that they appreciate their responsibilities in this direction. This State is indeed to be congratulated on the fact that notwithstanding their great personal difficulties, its Wheat-growers have not hesitated to place under Wheat in 1931 an area almost equal to that seeded in 1930, in which year a new State record for areas sown was established.



In this connection it seems to me well that we should remind ourselves that farming, no more than engineering, teaching, and other relatively ill-paid avocations, is not usually taken up for the sake of the profits it may promise, but rather as a means of earning a modest livelihood in congenial occupation. You are farmers, I take it, because you love farming, notwithstanding the hardships it occasionally entails; you love the scent of the turning sod, the willing work of a well-balanced team, the tender green of the newly sprouted grain; and if you rise early and retire early, it is what Nature intended. Man should labor by the light of the Sun; it is wild beasts only that roam about at night, seeking whom they might devour. There are very few of you who would exchange farming for any other occupation, notwithstanding the illusive glamor of cities, with their mansions and slums, their noisy crowds and lonely souls, their occasional "plums" and more frequent unemployment. In the City, when costs of production are not adequately balanced by selling prices, the manufacturer has no alternative but to shut up shop. Does the same hold good in the country? I think not; and the thousands of farmers that are clinging to the land to-day is clear proof of it. Let us look into this matter more closely.

In Mr. Crawford's estimate total yearly expenditure was represented by £2,039 and total yearly receipts by £1,380 only, if we assume Wheat to realise 2s. 6d. a bushel only; this represents a loss of £659 on the year's transactions, which proportionately would be sufficient to cripple any manufacturer. But in these total costs of £2,039 are included two items, namely, Interest and Depreciation, £822, and Management and Labor £560, neither of which involve actual payments, unless the farmer is in debt, or runs his farm on hired labor. We shall agree that in principle the farmer is entitled to expect the value of these items from his farm returns; but if in any particular year, as a result of seasonal difficulties or low prices, farm returns are insufficient to provide for Interest and Depreciation, his means of livelihood are not necessarily in jeopardy, unless indeed he is in debt to an unreasonable extent. If now we deduct the value of Interest and Depreciation—£822—from total costs—£2,039—we shall get £1,217, representing all other costs, and including £560 for remuneration of Management and Labor. And since total receipts with Wheat at 2s. 6d. have been set down as £1,380, the farmer and his family, assuming no hired labor to be employed, would be in receipt of £723, but no provision would have been made for interest and depreciation. If we assume that there were a mortgage on the property to the extent of half its value, i.e., £4,800, this at 6½ per cent., would involve interest charges of £312 per annum, which on deduction would still leave to the farmer and his family £411 for the immediate expenses of the year. Mr. Crawford, on the other hand, makes no reference to possible returns from Cows and Poultry; when the latter are added to other farm activities they can without great cost be made responsible for additional farm revenue to the extent of £100 to £150 per annum.

In conclusion, I shall say relatively to the present position of farmers that whilst at present prices they are certainly not receiving adequate returns for their efforts and for the Capital they are compelled to sink in their business, they have the satisfaction of knowing that they are not alone in this plight; and that those among them who have husbanded their resources in the past, and have not over-capitalised their farms on borrowed money, should be able to pull through, at the expense, it is true, of temporary reduction in their standard of living. A farmer has the advantage of a rent-free roof over his head; with ingenuity he can almost make his farm support him in foodstuffs; and facing, as we hope, an excellent season, he has good reason for optimism, notwithstanding unsatisfactory current prices for rural produce. There are, of course, some who are carrying a load of debt out of proportion to the producing value of their holdings, and to these I can offer nothing beyond the sincerest sympathy in their troubles.



## THE FUTURE.

It has been suggested that after dealing with the present position of farmers, I should don the mantle of a prophet and discuss the prospects of the immediate future. But, apart from the fact that I have probably already trespassed upon your patience unduly, it has always seemed to me that it is not in times of adversity that we should concern ourselves much with the future, except, perhaps, to keep up our courage. If, on the other hand, in the days of our prosperity we were to give some thought to the lean years that always lay ahead of us, we should, when the latter come, meet them on more equal terms. But lest I be accused of running away from the question I am prepared to say a few concluding words on the future.

I have already expressed the opinion that Wheat prices are likely to improve slightly in 1932; and although we cannot hope for a return of abnormal post-war prices, there is every reason to believe that succeeding years will gradually raise Wheat to normal value. I have indicated below, in ten-year periods, the mean prices of Wheat during the past 69 years:—

|                   | <i>s.</i> | <i>d.</i> |          | <i>s.</i>       | <i>d.</i> |
|-------------------|-----------|-----------|----------|-----------------|-----------|
| 1861-70 . . . .   | 5         | 11        | a bushel | 1901-10 . . . . | 3 10      |
| 1871-80 . . . .   | 5         | 3         | a bushel | 1911-20 . . . . | 5 5       |
| 1881-90 . . . .   | 4         | 4         | a bushel | 1921-29 . . . . | 5 2       |
| 1891-1900 . . . . | 3         | 9         | a bushel |                 |           |

It can be added that during this period of 69 years, in five seasons only was the mean 12-month price of Wheat below 3*s.* a Bushel, namely:—

|                | <i>s.</i> | <i>d.</i> |          | <i>s.</i>         | <i>d.</i> |
|----------------|-----------|-----------|----------|-------------------|-----------|
| 1893-4 . . . . | 2         | 3         | a bushel | 1899-1900 . . . . | 2 9       |
| 1894-5 . . . . | 2         | 9         | a bushel | 1900-01 . . . .   | 2 10      |
| 1898-9 . . . . | 2         | 9         | a bushel |                   |           |

A contemplation of these figures, coupled with the knowledge that economic factors are quietly working in our favor, should lead to the belief that we are well on the way to the 3*s.* mark, whilst we hope that 4*s.* a bushel will be attained in no distant future. In the meanwhile Farmers must carry on to the best of their abilities and means, and take such consolation as they may from the thought that nothing but mismanagement or extreme ill-luck can put them out of employment.

There is another factor which might be made to contribute to the end we have in view, if only Primary Producers of the Commonwealth could be induced to present a common front in the matter of Commonwealth fiscal policy. A reduction in costs of production would be equivalent to an increase in price per bushel. Our present relatively high costs are in part the natural consequence of 30 years of Protection policy, adopted deliberately with a view to rendering Australia self-supporting in the matter of important secondary industries. The object aimed at has probably been attained by now, but at the expense of primary production, which, like all these secondary industries, will soon find itself unable to compete on the markets of the World, because of unnaturally inflated Costs of Production. The remedy is for Primary Producers of the Commonwealth to unite and demand a purely revenue-earning tariff. The secondary industries have had 30 years to consolidate their positions, and if with the assistance of a 10 per cent. *ad valorem* tariff and long distance freight they are unable to hold their own on the home market, it is time that they sent in their checks.

If the fight to reduce tariffs fails there is an alternative which has been adopted in other primary industries with an exportable surplus, such as the Dried Fruit industry, and that is, the fixing of a special price for the home market, which for Wheat could



be secured by means of a Sales Tax or an Excise Duty on Flour used for home consumption, the proceeds of such tax or excise duty to be divided equitably among all Wheat Growers of the Commonwealth *pro rata* to the amount of Wheat delivered by each grower to market. However much one might dislike these artificial props to production, they represent, unfortunately, the only alternative in the artificial atmosphere of a country run mad on protection.

I anticipate, too, that in the future there will be few farmers who think themselves above taking regular advantage of the profits that can always be derived from Cows and Poultry: both in their way yield exportable products, and as such are important national assets. It is possible, too, that pork, if not green bacon, may yet come into its own as a commodity of profitable export, but of this I am less confident. Apart from exceptional conditions of locality or climate, I am assuming that the farm of the future that is without its well-bred Fat Lamb Flock, its sleek milkers, and its busy hens, will be as much an anomaly as a farm without horses at the present moment. This intensive association of Live Stock with cropping operations is not likely to reduce appreciably present-day areas sown to Wheat; it will, however, assist to maintain our soils in a high state of fertility. Nor in the days of their prosperity will future farmers neglect to make ample provision for the Live Stock requirements of succeeding lean years.

At your request and on your behalf I have tried to look at both the present and the future with eyes of hope; and if I have been able to do so, it is because I am not without experience of the South Australian Farmer, and that I have the utmost confidence in his ability to pull not only himself, but others as well, out of tight corners. I feel that your faces are set towards the dawn of better things: go on and prosper, but do not forget that evening shadows follow the dawn.

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## RECENT DECLINE IN THE DAIRYING INDUSTRY: ITS CAUSES AND REMEDY.

ADDRESS TO S.A. BUTTER AND CHEESE FACTORY MANAGERS AND  
SECRETARIES' ASSOCIATION.

[By ARTHUR J. PERKINS, Director of Agriculture.]

I should put first and foremost among the causes of decline that have overtaken the Dairying Industry within recent years the fact that we have not yet developed as a people what for want of a better term I shall call the Dairying "sense." By this I mean that we are in the habit of taking up Dairying when needs must, but hasten to drop it again as soon as we can see our way to some more congenial form of occupation. We are apt to magnify its so-called "drudgery"—I have heard it called White Slavery—and we are often blind to the great interest that should attach to the efficient handling of a herd of high grade milkers. I recognise that an unwilling Dairyman will never make an efficient one, and I shall suggest in the sequel that the first step towards building up a great and permanently profitable industry should be an organised attempt to interest the rising generation in Dairying.

The second and perhaps more obvious cause of the decline has been the abnormally high post-war prices of both Wheat and Wool. These prices led very generally to the replacement of Cows by Sheep, whilst many farmers preferred to concentrate on the profits which could at the time be derived from Wheat to the exclusion of all Livestock operations.

A third cause was the high prices offering for meat on the local markets. A fat cow came to be considered too valuable to be kept on the farm, and usually found its way to the butcher's. In addition, both bull and heifer calves were indiscriminately sent to market at the first opportunity.

The cumulative result of all these destructive forces has been that in the course of six successive seasons South Australia lost over one-third of her Milch Cows, a fact which to-day is hampering us very considerably in our attempts to extend our Dairying operations.

I have suggested that in order to overcome our national dislike of Dairying we should endeavor to open the unprejudiced eyes of Youth to the great interest that attaches to Dairying as an occupation. In the present critical state of our affairs, when the City can no longer offer careers to the rising generation, and the cry of a return to the land is making itself felt in our midst, would appear to rest our opportunity. In the early nineties, and in somewhat similar conditions, the same cry, as some of you may recollect, led to the establishment of Village Settlements on the banks of the Murray; whilst some of our more imaginative citizens sought greener fields in distant Paraguay. This attempt at settlement of untrained and inexperienced City dwellers in the wilderness probably fulfilled its main if hidden purpose of giving temporary employment to some of the unemployed; but from the standpoint of permanent land settlement it was eventually an unmitigated failure. Eventually, too, after variegated careers, the Paraguayan adventurers crept back to our drabber conditions. And to-day, when similar schemes are more or less in the air, it would be well that we bore in mind the lessons to be derived from the experiments of the nineties.

I have, however, no intention of suggesting the expansion of Dairying as a temporary measure for coping with present-day unemployment. Indirectly, no doubt, it will contribute in some measure to the reduction of unemployment: but we cannot hope to build up effectively a great industry calculated to help the State out of its financial difficulties, if we attack the problem from the angle of purely temporary expediency. We all recognise that one of the main causes of our troubles is the calamitous fall in World prices of our exportable commodities, and the consequent reduction in our



national income: the obvious remedy has been suggested that we should strain every nerve to increase production in proportion to the decline in prices. When, however, the general level of prices is considerably below actual costs of production the whole burden of rehabilitating the community is actually thrown upon producers, and it is to be feared that in present circumstances our producers of Wheat and Wool—our main exportable commodities—are doing all that circumstances permit them to do. In order, therefore, to increase the value of our exportable commodities there remains to be considered whether important portions of our territory could not be put to more profitable use from the standpoint of exports. In this connection, and in present circumstances, I know of one and one only form of rural activity likely to give us the desired results, and that is the intensive practice of Dairying, associated in some degree with Poultry-Keeping. Although far from munificent, World prices for Butter and Cheese are sufficient to maintain the careful dairyman on the land; there appears even to be some hope of the profitable export of fresh pork, if not of bacon; eggs, too, in the shell or in the state of pulp, represent valuable export commodities. I am of the opinion, therefore, that the economic situation offers no insuperable obstacle to the expansion of dairying in our midst, could we but take to it in the right spirit. Dairying saved Victoria in the past; it is one of the chief sources of wealth of our neighbor, New Zealand, and of many other progressive countries of the world: it is not yet too late for us to take up the running. Towards this end, wherever conditions of climate and soil warrant it, land should be subdivided into smaller units, and in many instances Sheep will have to give way to more profitable Cows. In our Hills' Districts and the South-East alone there are enormous areas that should gradually be converted into Dairy Farms. The top-dressing of pastures, coupled with the introduction of improved grasses and clovers, has rendered successful dairying possible in these districts on quite moderate areas. The more general use of Ensilage, on the other hand, would open the way to successful Dairying, in districts of less abundant rainfall. Finally, general farmers are coming to realise their mistake in discarding Cows: there are over 12,000 of them, and they could easily be responsible for 100,000 Cows.

I realise, however, that in these times of financial stringency and low prices for rural products considerable responsibility rests upon those who take upon themselves the task of recommending expansion of any one of our rural industries. Such expansion, although eventually of advantage to the State, may not prove profitable to the individual producers. I propose, therefore, from the data available to me, to examine to what extent Dairying should prove profitable in the hands of the average careful Dairyman.

At this stage I must state frankly that in these difficult times it is not from the standpoint of "Net Profits" that this question can be discussed: and this notwithstanding the fact that I am persuaded that even in these times such Profits are not altogether beyond the reach of progressive dairymen. But in many cases, as in most rural occupations to-day, there will be no net profits; they may even be replaced by losses on a strict accountancy basis; and yet the producer will continue on his holding by accepting a temporary reduction in his standard of living: it is the sacrifice he makes for the common good, receiving in return continuous employment in congenial occupation. Hence, the only possible method of approaching the subject is to ascertain whether under good management the average Dairyman is likely to realise a Labor Income sufficiently great to maintain himself and his family on the land, and not whether he can anticipate adequate interest on Capital invested. And this, unfortunately, is the position of most primary producers at the present time.

In this connection I shall take advantage of a recent financial Survey of Dairying under Irrigation Conditions carried out by the Federal Development Department, over which the Honorable J. Gunn presides. The survey in question concerned the irrigated areas of New South Wales, Victoria, and South Australia for the season ending the 30th June, 1929, i.e., at a time when the value of Dairy products was approximately 10 per cent. higher than at present. For the sake of simplicity, however, I shall confine my quotations to results registered for the Murray Swamps and the Goulburn Valley respectively.



The Survey shows that the mean Labor Income of 34 Goulburn Valley Dairymen on farms 76.3 acres in mean area averaged £250 10s. per annum, and on the Murray Swamps for 36 Dairymen on farms averaging 37 acres, £246 10s. When we bear in mind that these Labor Incomes represent the differences between Mean Gross Receipts and Mean Expenditure incurred apart from the value of the personal Labor of the farmers concerned; that in this expenditure are included not only actual out-of-pocket expenses, but in addition the value of the assistance which the farmers received from members of their families, together with interest and depreciation on Capital, apart from that on the farmers' dwelling houses; when we take all this into consideration we shall probably agree that these mean Labor Incomes, although far from princely, should suffice in these times to keep the competent dairyman and his family on the land.

I have already expressed the opinion that the progressive Dairyman should be able to do even better than that; and the Survey of the Development Department goes far to prove my contention, as the data in the following Table will show:—

TABLE I.—*Mean Data concerning Irrigated Dairy Farms in order of Labor Incomes earned in 1929.*

| No. of Farms.    | Labor Incomes. |             | Mean Areas. | Mean No. of Cows. | Receipts.   |             | Expendi-<br>• ture. |
|------------------|----------------|-------------|-------------|-------------------|-------------|-------------|---------------------|
| Nos.             | Range.<br>£    | Means.<br>£ | Acres.      | Nos.              | Dairy.<br>£ | Total.<br>£ | £                   |
| GOULBURN VALLEY. |                |             |             |                   |             |             |                     |
| 10               | Under £150     | 72.8        | 83.7        | 17.0              | 459.6       | 624.5       | 552.1               |
| 7                | 150-249        | 207.3       | 72.3        | 18.6              | 492.9       | 706.2       | 498.9               |
| 8                | 250-349        | 279.1       | 63.0        | 18.8              | 595.0       | 762.5       | 483.4               |
| 9                | 350 and over   | 456.6       | 82.8        | 22.3              | 1,006.3     | 1,212.5     | 756.1               |
| 34               | Means          | 250.5       | 76.3        | 19.2              | 643.0       | 829.4       | 579.0               |
| MURRAY SWAMPS.   |                |             |             |                   |             |             |                     |
| 7                | Under £100     | 46.4        | 34.8        | 20.2              | 496.1       | 524.1       | 477.6               |
| 11               | 100-199        | 137.5       | 36.8        | 23.9              | 635.0       | 704.9       | 567.6               |
| 6                | 200-299        | 257.8       | 40.8        | 24.5              | 685.9       | 740.2       | 482.4               |
| 7                | 300-399        | 360.6       | 42.4        | 29.1              | 926.7       | 970.4       | 609.8               |
| 5                | 400 and over   | 593.0       | 42.6        | 26.9              | 905.7       | 1,100.4     | 507.2               |
| 36               | Means          | 246.5       | 37.0        | 24.7              | 710.8       | 782.2       | 535.7               |

You will observe that in Table I. the 34 Goulburn Valley Dairymen have been split up into four groups with Labor Incomes of progressively improving values; and that similarly the 36 Murray Swamp Dairymen have been distributed among five approximately corresponding groups. For the purpose of the comparison I have in mind I shall make no mention of the intermediate groups, but simply call your attention to the extreme groups, that is to say, the groups comprising farmers with lowest and highest mean Labor Incomes respectively. In this connection you will notice in the first place that there is little to choose between the mean areas of the Goulburn Valley Farms in either group, but that the mean number of Cows milked is greater in the group with high Labor Incomes than in the one with low Labor Incomes; that mean total receipts of Farmers with high Labor Incomes were nearly double those of Farmers with low Labor Incomes, whereas their expenses apart from Personal Labor were not 50 per cent. greater than those of Farmers with low Labor Incomes. The net result is that whilst 10 Farmers earned mean Labor Incomes of £72 16s. only, nine others, working under almost identical conditions, earned mean Labor Incomes of £456 12s., i.e., approximately 6½ times greater. That the main cause of these striking differences is one of personal management is emphasised by the fact that the mean Labor Income per Cow is £4 5s. 8d. only in one case and £20 9s. 6d. in the other.

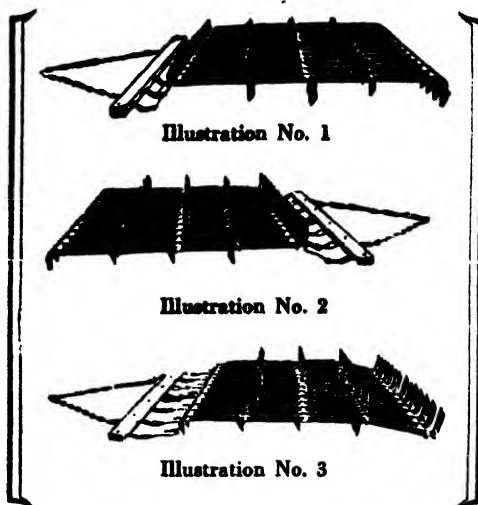
I shall not worry you with an analysis of the position of the Murray Swamp Dairymen beyond drawing attention to the fact that the Mean Labor Income of seven Dairymen was £46 8s. only, or £2 6s. 4d. per Cow, whilst that of five others working under very similar conditions was £593 or £22 8s. 11d. per Cow.



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These figures, I believe, confirm my impression that given careful management and adequate business acumen it is possible to make more out of Dairying than falls usually to the lot of the average man. They may also be said to stress the great difficulty of striking an accurate mean for the costs of production of agricultural products in any given district, let alone for a whole State offering an infinite variety of natural and economic conditions. It might probably be said of the Dairymen we have had under consideration that if it cost the most successful 4d. a gallon—to take an altogether random figure—to produce milk, it probably cost the least successful in excess of 2s.

It may be objected that the figures quoted above have reference to Dairying under irrigation conditions only, and that corresponding Labor Incomes would not necessarily be earned under non-irrigated conditions. Unfortunately, I have no corresponding figures for purposes of comparison; but as a matter of personal impression I shall state that Mean Labor Incomes of equal value to those of irrigated areas can be earned on non-irrigated areas, provided that the Dairyman is placed on suitable country and that he has not purchased his land at inflated values, and that possible lower mean milk yields are usually set off by lower costs of production. In the circumstances I feel justified in maintaining that of the various rural occupations practised in our midst to-day Dairying is among the very few, if it does not stand alone, that can safely be recommended for almost unlimited expansion.

You may perhaps be inclined to think that my contention that the future expansion of the industry is contingent upon our ability to interest the rising generation in Dairying, savors somewhat of an attempt to put off the evil day. This, however, is very far from being the case. I am perfectly willing to welcome into the fold—or shall we say the cow byre—every seasoned veteran of parts who hears the call and is prepared to stand by his cows to the end of his days. On the other hand, at the present moment cows are not locally available at acceptable prices and in numbers adequate to any important degree of expansion; and I need not remind you that a mere change in ownership of cows because ruling prices happen to be high does not imply any appreciable degree of expansion in the industry. It is for this reason that I suggest that willing, unprejudiced youth should be taken in hand to-day, at a time when normal avenues of employment are closed to it, and that during the necessary interval of training we should prepare the way for its ultimate settlement in profitable and we may hope congenial occupation.

But what in the meanwhile should be done? The suggestions that follow involve in some degree questions of Government policy, and must not therefore be taken to have more value than that of my own personal opinion:—

1. An immediate call should be made for suitable youths willing to take up training as Dairymen with a view to ultimate settlement on the land. The Roseworthy Agricultural College could absorb some of them, even if as an emergency measure they had to be housed under canvas. Others could be apprenticed to approved dairymen; and the balance, if any, might be allotted to special relief farms that could be brought into being for the purpose.

2. Special steps should be taken to see that suitable land were made available for Dairying at an early date, and preferably not later than two years hence. What these steps should be would probably involve political action, and I must therefore leave their determination to others.

3. We should do our utmost to check the slaughter of heifer calves and to see that they ultimately take their place in the depleted ranks of our milkers. Towards this end we should make full use of moral suasion, and if necessary of legislative action. I do not suppose that we could reasonably prevent an owner from slaughtering a calf on his own premises; but we could surely do so at the public slaughter yards to which the majority would tend to gravitate. Provision, too, should be made for taking over at a moderate fixed price the calves of those who are unwilling or unable to rear them, on the understanding that the owner, if he so desires, should retain an option over them at a specified age.



4. It must be assumed that the type of settlement I have in mind would imply temporary State assistance to some of the settlers; but if undertaken, it is to be hoped that our recent experiences in the matter of Soldier Settlement will effectively block the way to settlement on the basis of 100 per cent. borrowed money. I suggest that no settler should have less than £500 in Cash, or its free equivalent in Stock and Plant.

5. The land would probably be allotted on a Covenant to purchase agreement; and as the object in view would be the settlement of Dairymen, and not of axemen, I suggest that if the land be not cleared, it should be cleared by contract prior to allotment, and the cost of clearing be added to the original cost of the land. Had this policy been adopted in the settlement of the Mallee many a pioneer settler would not have been ruined in the process of preparing the way for another.

6. If possible, steps should be taken towards securing suitable Milch Cows from the neighboring States, and to dispose of them to Dairymen at cost price.

7. Apart from the settlement of what might be termed full blooded Dairymen, every encouragement and assistance should be given to Wheat Farmers to keep Cows. An effectively handled herd of 6 to 12 Cows would probably constitute the safest form of insurance against intermittent need for State assistance in years of drought.

8. We should take early steps towards giving the Industry from which we expect so much effective protection against the Margarine menace.

We are probably all agreed that the State stands in need of increased Dairy output, but thus far we have considered this need from the standpoint of increase in numbers of both Dairymen and Cows only. Obviously, however, increased total output can be secured within certain limits by increasing the mean output of existing herds. And let me say here that we are just as much in need of increased output per Cow as of increased State output—one should go with the other. Indeed, the former presents the inestimable advantage of reducing the costs of the Dairyman and of putting him in a better position to meet successfully a period of falling prices. The time allotted to me does not permit of my dealing in detail with this question; moreover, there does not appear to be any particular need for me to do so, since I notice from the agenda that my friend, Mr. Barlow, proposes rehabilitating the Industry, and I have no doubt that increased production per Cow will receive his special attention. I shall therefore content myself with bringing under your notice what have been the mean milk yields per Cow of the various States over a period of five years, closing in 1928-1929:—

TABLE II.—*Showing Mean Milk Yields per Cow, 1924-1929.*

|                         | Seasons.          |                   |                   |                   |                   | Mean of<br>Five-year<br>Period.<br>Galls. |
|-------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------------------------------|
|                         | 1924-5.<br>Galls. | 1925-6.<br>Galls. | 1926-7.<br>Galls. | 1927-8.<br>Galls. | 1928-9.<br>Galls. |                                           |
| New South Wales .....   | 391               | 346               | 332               | 338               | 326               | 346                                       |
| Victoria .....          | 393               | 343               | 369               | 401               | 450               | 389                                       |
| Queensland .....        | 310               | 270               | 246               | 319               | 297               | 289                                       |
| South Australia .....   | 336               | 317               | 329               | 332               | 337               | 330                                       |
| Western Australia ..... | 218               | 239               | 244               | 261               | 277               | 248                                       |
| Tasmania .....          | 311               | 266               | 305               | 336               | 362               | 315                                       |
| Commonwealth.....       | 363               | 320               | 319               | 349               | 352               | 341                                       |

It will be observed that relatively to those of the other States our milkers have not shown up to any great disadvantage during this period of five years, notwithstanding the fact that we were suffering from the effects of drought over the greater part of the time. Nevertheless, we can aim at more than an average of 330 gallons per Cow. Victoria attained to 450 gallons in 1928-1929, and there is no reason why, with improvement in our Dairy Stock, and particularly with better feeding methods, this figure should not be the general average for the Commonwealth.

I am afraid that this address, which has been rather hurriedly prepared, does not give a very adequate statement of what in my mind I had intended to say. In the main I wished to express my belief in the Dairying Industry as one of the levers that is destined to lift the State out of its present uncomfortable position; and that we should do all in our power to forward its development and to encourage the younger generation to assist us in the process.



## CITRUS EXPERIMENTS AT THE STATE EXPERIMENTAL ORCHARD, BERRI.

[By GEO. QUINN, Chief Horticultural Instructor, and N. S. FOTHERINGHAM, Manager Berri Experimental Orchard.]

### FERTILISER TESTS.

In 1920 a series of tests with fertilisers was inaugurated at the above Orchard. Although the primary object was to endeavor to ascertain what, in this regard, constituted the limiting factor or factors governing the successful development of healthy citrus trees and the production of profitable crops therefrom, it was hoped, at the same time, by using each fertiliser in increasing quantities upon adjacent rows of trees in the plot devoted to that particular fertiliser, to obtain some information as to the most profitable quantity to apply to the citrus soils of the Murray Valley.

Four plots of trees were selected to be annually dressed with superphosphate, bonedust, sulphate of ammonia, and sulphate of potash respectively. In between the two plots receiving the phosphatic dressings, two others, each consisting of one row only, were dressed with a "complete fertiliser" composed of superphosphate, sulphate of ammonia, and sulphate of potash in one instance, and in the other, bonedust equivalent in phosphoric acid replaced the superphosphate.

As the land is naturally rich in lime carbonate, these combinations may be deemed to represent what are popularly termed "complete fertilisers," whilst the four first-named fertilisers represented dressings of water soluble phosphoric acid, water insoluble phosphoric acid, readily available nitrogen and potash respectively.

The only citrus trees of a fruit-bearing age in the Orchard in 1920 consisted of Washington Navel oranges which had been procured by the Irrigation Department from various commercial nurseries and planted in 1912. The exact species of citrus used as stocks for these trees and the origin of the buds worked upon them were, and are still, unknown to us.

The surface soil on which these plots are located consists of sand-ridge land typical of the upper terraces of the Murray River frontage areas. It consists of a very loose, sandy loam, in which the proportion of sand is very high. The sand therein ranges from a finely granulated, dusty, grey-colored powder to a very coarse, gritty, reddish soil body. The former type occurs most freely in small patches, chiefly in the plots to which phosphatic fertilisers were given, and the coarse, red-colored type predominates throughout the nitrogen and potash treated sections.

During the progress of the trials, 45 holes were sunk midway between every alternate row of trees in the plot devoted to phosphatic fertilisers and 35 at similar intervals throughout the nitrogen and potash dressed areas.

This was done to ascertain, as correctly as possible, the nature and depth of the soil above the limestone marl and to note, at the same time, the penetration of the root systems of the trees, and, incidentally, that of the irrigation water.

The surface of the phosphatic-dressed area presents a gentle slope to the south-west by south, whilst that receiving the nitrogen and potash turns towards the south-east, facing the morning sun. A study of the borings indicates that the greater depths of soil in these plots are found along the lower margins of their slopes.

In the phosphatic tests the soil depths ranged from 7in. to 33in. above the sandy marl, the average depth over the whole plot being 18.5in., the top row holes indicating an average depth of 13.2in. and the lowest row 18.5in. above the sandy marl. The soil depth is greater in the nitrogen and potash plots, ranging from 10in. in one small but higher spot, to 45in. at the lowest southern corner before the sandy marl is reached.



The average along the channel outlets on the upper margin of these plots is 13.5in. and along the lower end of the water run 38.3in. The average depths of loam over these two plots is 25.7in. above the sandy marl. The sandy marl in most soundings persists for nearly a foot deeper before the actual marly clay of varying consistency is reached.

Observations made relative to root penetration indicated that scarcely any roots were found below the sandy loam and practically none had penetrated into the marly clay which, in most parts, underlaid the sandy marl. It may be assumed, therefore, that the principal root activities take place in this soil in the layer extending from below the plough depth, say, 7in., to 30in. below the surface of the land, or approximately in a stratum 2ft. thick. In the area occupied by phosphatic tests the clay marl apparently defines the rapid penetration of the irrigation water before it begins on this sloping ground to move down the face of the substrata to find an outlet at some lower level. In the area devoted to trials with nitrogen and potash the marl probably contains less clay and rapid percolation takes place through it.

The procedure adopted in applying the fertilisers consisted of ploughing a furrow from 7in. to 8in. deep along each side of the row of trees and skirting the spread of the boughs in the direction of the water run. Owing to the steepness of the slopes, the water in most instances could not be directed diagonally across the spaces between, or, in other words, to evenly soak the soil all around the trees.

The quantity of fertiliser used per tree was distributed by hand along the bottom of this furrow and another furrow slice of soil turned over it. The irrigation water was then run down this second furrow until it had thoroughly soaked through the bank which covered the fertiliser. The quantity of fertiliser applied each year was divided into two equal parts, one-half being applied in early spring, several weeks prior to the blossoming of the trees, and the other at mid-summer.

There are 15 tests in all, consisting of four with water soluble phosphoric acid (superphosphate) applied at the rates of 3, 6, 10, and 12cwts. per acre, two with water insoluble phosphoric acid (bonedust) at the rates of 605lbs. and 1,008lbs. per acre, and two each with readily available nitrogen (sulphate of ammonia) and potash (sulphate), each at the rates of 2cwts. and 5cwts. per acre respectively. Of the two tests dressed with a "complete fertiliser," one receives a combination consisting of superphosphate—6cwts. sulphate of ammonia—2cwts. and sulphate of potash—2cwts. per acre rate respectively; whilst the other receives 605lbs. of bonedust, 2cwts. sulphate of ammonia, and 2cwts. of sulphate of potash per acre rate respectively.

Sandwiched in amongst these test rows are three rows which were not manured during the first eight years, but retained as checks upon the results obtained from the fertilised rows. Each of the barrier rows which separate the rows under test from each other receives on its side a quantity of fertiliser approximately equal to half the quantity of the particular fertiliser or fertilisers which is being applied to the test row immediately adjacent to that side. It follows, therefore, that barrier rows receive unequal dressings on either side of the trees, the aggregate quantity being different from that given the test row which stands adjacent on either hand.

The records of produce and the general development of the trees in these barrier rows afford in many instances a means of direct comparison with the effects resulting from the application of quantities of the various fertilisers intermediate between those weights applied to the accredited trial rows.

Each test in the plot dressed with water soluble phosphoric acid now contains 10 trees. The complete fertiliser containing superphosphate was given to nine trees, and that containing bonedust in lieu of superphosphate to eight trees only. Each barrier and no manure check row in this plot carries 10 trees.

In the water insoluble phosphoric acid dressed plot, the test row which received 605lbs. of bonedust contains six trees, as also does the row to which 1,008lbs. of bonedust is given. The no-fertiliser check row here holds four trees only. These reduced numbers arose from the abandonment of portion of the land after the first five years' operation owing



to the development of a "salt patch" at one corner of that particular area. Prior to this development the rows fertilised with superphosphate carried 17 trees, and those receiving bonedust and complete fertilisers ranged from 16 to seven trees each. The trees in the plots receiving superphosphate, bonedust, and "complete" fertilisers are planted 24ft. apart on the square system = 75 trees per acre. Those in the nitrogen and potash trial plots are set out on the rectangular system, 22ft. x 20ft. = 99 trees per acre.

A close scrutiny of the trees in each test row has revealed that what are popularly known as "off type" Navel trees were very prevalent. This term as applied to Navel orange trees refers generally to the coarse character of the fruits borne. They usually have rough, thick, and oftentimes corrugated skins, and in some instances a tendency to lack juiciness. These trees are almost invariably distinguishable by their upright gross limb growth and large leaves, whilst a tendency to display shyness in cropping is also not an uncommon characteristic attributable to them.

Although, unfortunately, the cropping data of the individual trees was not recorded in the first eight years of these trials, it will be observed from the accompanying tables that the shy cropping habit was not a consistently outstanding feature of the "off type" trees in those tests in which there was appreciable response to the fertiliser applied—as indicated by comparison with the unmanured check rows. For instance, in the plot treated with water soluble phosphates, the rows dressed at the rates of 3cwts., 6cwts., and 10cwts per acre showed 7/9ths, 7/10ths, and 3/5ths respectively of their trees to be "off type" Navels, whilst the row receiving the 12cwts. per acre had no "off type" forms. This preponderance of "good type" trees was the case also in the unmanured check row which stands next but one remove away.

After these trials had been conducted for eight years, viz., 1920-1928, the results, as indicated in the figures of fruit yields as set out in Table I., together with the comparative condition of health and growth observable in the trees, demonstrated beyond doubt that the immediate limiting factor in the growth and productiveness of citrus trees in such soils in the Murray Valley was the restricted supply of nitrogen in the land. In no instance where this element was omitted, or where inadequate quantities of it were applied, was there any consistent response in the form of improved tree condition or increased cropping capacity displayed. This lack of improvement was particularly emphasised in the plots to which either potash or soluble phosphates were applied. The hundred trees which the former plot held gradually ceased to grow and assumed a sickly, yellowish green color in the leaves. The fruits, with few exceptions, fell with the first outburst of summer heat. This feature is clearly emphasised in the season 1928 (*see* Table I.), when five rows consisting of 83 trees bore only 605lbs. of oranges, or approximately 12 bushel cases. It may be incidentally mentioned this fruit was generally small in size and possessed a very smooth, pale yellow skin over a sweet, solid pulp.

The trees in the tests receiving water soluble phosphates, though less anaemic in appearance, made poor growth, and, as Table I. indicates, cropped very sparingly. Their fruits, though deeper in color on the rind than those in the potash tests, were somewhat less sweet to the taste, and the skins were thicker, though not unduly coarse.

In the rows receiving mixed fertilisers and water insoluble phosphate (bonedust) the trees gradually improved in health and cropping capacity. The fruits from these trees displayed a deep orange-colored rind, distinctly thicker than that on those gathered from the potash and soluble phosphate treated trees. The pulp was juicy and quite well balanced in flavor. This very gradual increase in rich, healthy green foliage and in crop production leads us to suspect that the nitrogenous factor, viz., 3.25 per cent. contained in the bonedust, which was absent from the tests hitherto described, had much influence in creating these effects. The trees in the tests dressed with sulphate of ammonia began at an early stage in these trials to indicate that when used at rates of from 3cwts. per acre upwards improvement took place. The trees assumed a vigorous deep green appearance which was well maintained throughout the whole period, whilst the crops soon increased far beyond those in the plots fertilised with other forms



of plant foods. The fruits borne on these trees developed a deeper orange-red color on the rind, which was itself somewhat rougher and crisper than that found on fruits produced upon trees in any of the other plots. The pulp, however, proved to be juicy and not over sweet. The failure of the superphosphate dressed trees to yield profitable crops or make reasonably good growth, and the palpable decline in health and cropping capacity displayed by those to which potash alone was applied demanded a change of treatment in which nitrogen should be included. It was resolved, therefore, in 1929 that the plot constituting the trials with water soluble phosphates should be divided transversely into two sections, and, besides continuing to apply the superphosphates as heretofore to the various rows, one-half of the trees in each row should, in addition, be dressed with sulphate of ammonia at the rate of 5cwts. per acre, whilst the other half should receive stable manure at the rate of approximately 12 tons per acre—deemed to contain an equivalent in nitrogen to the above quantity of ammonium sulphate.

The plot, in which the trees were formerly fertilised with potash only, was also similarly subdivided into two equal parts. Each of the rows were to receive their dressings of sulphate of potash as heretofore, but at the same time one-half of each row was to be given sulphate of ammonia at the rate of 5cwts. per acre, whilst the other (the upper) half would be dressed with an equivalent in nitrogen from an organic source, viz., blood manure, at the rate of 7½cwts. per acre. Excepting the stable manure, which is ploughed in during the winter, these additions of nitrogenous dressings are divided into three parts—one being applied in early spring, another towards mid-summer, and the third later in summer—each put in with its respective irrigation. Between these subdivisions, in both the phosphatic and potash tests, a barrier row was set up at right angles to the run of the irrigation furrows.

This amended programme was put into operation in the spring of 1929, and the tests thus treated are each indicated by a cross in Table I. Table II. gives the resulting crops from the whole of the amended test rows for the year 1930.

As only one year's cropping results are available from the tests receiving the amended dressings, no comment is offered at present. Suffice it to say that to anyone who had previously viewed these plots, the changed condition of growth which has taken place in the trees in all of these amended trials needs to be seen to be properly appreciated. From the sickly, aenemic condition previously described they have, after undergoing only two seasons of the changed treatment, become transformed into healthy, vigorous trees, carrying this season (1931) an exceptionally heavy crop of fruit of splendid appearance.

The accompanying tables bring the results of these trials up to year 1930. In a paper contributed by the Manager of the Orchard to the *Journal of Agriculture of South Australia*, July 15th, 1929, pages 1010-1012, the results of the first eight years' operations and the yields from the actual test rows are set out in graphic form. An analysis of the costs and returns quoted in that paper showed that owing to the extraordinary yield gathered during the first year from the potash trial, dressed at the rate of 2cwts. per acre, that test was able to show an average profit of 8s. 5d. on the eight years' work in spite of gradually diminishing returns throughout the subsequent seven years. The position of this particular test, as shown by its yields, compared with those of the other potash dressed trials, will be the object of further inquiry in the future.

The outstanding feature of the analysis of the cropping data over the eight years' period referred to was the equivalent of an average annual profit of £22 3s. 6d. per acre indicated as the result of applying sulphate of ammonia to a plot of trees at the rate of 5cwts. per acre. In Table I. herein it will be noted that over a 10-year period the yields of oranges from an adjoining barrier row which has received each year a dressing equal to 4½cwts. of sulphate of ammonia per acre have, during eight of those years, exceeded those in the test row above referred to, averaging up to about 12½ cases per acre per annum over the 10-year period. This result will be further examined in subsequent work.



TABLE I.

| Block. | Row. | Fertiliser Applied, Rate per Acre.                                                                                                                       | Yearly Yields in Lbs. per Acre. |           |          |          |           |           |
|--------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------|----------|----------|-----------|-----------|
|        |      |                                                                                                                                                          | 1921.                           | 1922.     | 1923.    | 1924.    | 1925.     | 1926.     |
| B      | 1    | 188lbs. 36% W.S. phosphate                                                                                                                               | 1,584.37                        | 1,232.81  | 283.59   | 350.00   | 2,076.56  | 3,991.67  |
| B      | 2    | 336lbs. 36% W.S. phosphate                                                                                                                               | 1,560.91                        | 1,232.81  | 300.00   | 346.86   | 1,420.31  | 1,116.67  |
| B      | 3    | 504lbs. 36% W.S. phosphate                                                                                                                               | 1,901.46                        | 1,588.23  | 1,023.52 | 555.88   | 2,179.41  | 1,515.00  |
| B      | 4    | 672lbs. 36% W.S. phosphate                                                                                                                               | 2,710.71                        | 1,730.86  | 755.86   | 369.65   | 2,369.64  | 1,995.00  |
| B      | 5    | 896lbs. 36% W.S. phosphate                                                                                                                               | 2,330.36                        | 1,963.89  | 889.28   | 1,135.71 | 3,401.79  | 2,490.00  |
| B      | 6    | 1,120lbs. 36% W.S. phosphate                                                                                                                             | 1,420.00                        | 1,460.00  | 680.00   | 440.00   | 1,920.00  | 2,290.00  |
| B      | 7    | 560lbs. 36% W.S. phosphate                                                                                                                               | 6,514.06                        | 7,021.87  | 3,567.19 | 2,906.25 | 6,600.00  | 6,600.00  |
| B      | 8    | No fertiliser .....                                                                                                                                      | 8,382.35                        | 8,161.76  | 3,564.71 | 3,811.76 | 7,901.47  | 7,192.50  |
| B      | 9    | 672lbs. 36% W.S. phosphate                                                                                                                               | 7,429.41                        | 9,666.24  | 3,498.53 | 2,241.18 | 5,629.41  | 4,522.50  |
| B      | 10   | 1,344lbs. 36% W.S. phosphate                                                                                                                             | 4,312.50                        | 8,757.35  | 3,639.71 | 1,967.64 | 5,616.18  | 7,027.50  |
| B.     | 11   | 1,008lbs. 36% W.S. phosphate                                                                                                                             | 5,141.91                        | 8,391.18  | 3,975.00 | 4,597.06 | 6,728.53  | 8,790.00  |
| B      | 12   | 112lbs. sulphate of ammonia<br>112lbs. sulphate of potash .<br>672lbs. 36% W.S. phosphate<br>224lbs. sulphate of ammonia<br>224lbs. sulphate of potash . |                                 |           |          |          |           |           |
|        |      |                                                                                                                                                          | 2,525.00                        | 5,610.00  | 2,340.00 | 3,405.00 | 5,625.00  | 7,491.67  |
| B      | 13   | 336lbs. 36% W.S. phosphate<br>112lbs. sulphate of ammonia<br>112lbs. sulphate of potash .<br>336lbs. bonedust .....                                      | 4,628.57                        | 7,141.07  | 2,100.00 | 2,982.85 | 6,578.57  | 11,831.25 |
| B      | 14   | 605lbs. bonedust, 40%<br>A.S.P., 3.25% N.                                                                                                                |                                 |           |          |          |           |           |
|        |      |                                                                                                                                                          | 5,441.25                        | 9,127.50  | 1,492.50 | 2,970.00 | 5,357.50  | 11,025.00 |
| B      | 15   | 807lbs. bonedust, 40%<br>A.S.P., 3.25% N.                                                                                                                | 4,662.50                        | 9,656.25  | 656.25   | 2,756.25 | 5,315.62  | 6,525.00  |
| B      | 16   | 1,008lbs. bonedust, 40%<br>A.S.P., 3.25% N.                                                                                                              | 3,837.50                        | 5,950.00  | 1,966.66 | 1,883.33 | 4,633.33  | 7,475.00  |
| B      | 17   | 504lbs. bonedust, 40%<br>A.S.P., 3.25% N.                                                                                                                | 3,368.75                        | 3,575.00  | 1,775.00 | 2,812.50 | 6,312.50  | 4,245.00  |
| B      | 18   | No fertiliser .....                                                                                                                                      | 7,455.00                        | 12,130.00 | 4,005.00 | 3,870.00 | 8,885.00  | 7,631.25  |
| B      | 19   | 302lbs. bonedust .....                                                                                                                                   | 6,195.00                        | 8,460.00  | 7,810.00 | 9,165.00 | 10,470.00 | 12,075.00 |
| B      | 20   | 112lbs. sulphate of ammonia<br>112lbs. sulphate of potash .<br>605lbs. bonedust .....                                                                    |                                 |           |          |          |           |           |
| B      | 21   | 224lbs. sulphate of ammonia                                                                                                                              | 3,126.56                        | 2,723.44  | 3,075.00 | 4,771.88 | 6,579.37  | 7,800.00  |
| B      | 22   | 224lbs. sulphate of potash .                                                                                                                             |                                 |           |          |          |           |           |
| E      | 3    | 112lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 2,023.31                        | 1,949.06  | 420.75   | 1,503.56 | 4,120.87  | 5,185.12  |
| E      | 4    | 224lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 4,248.26                        | 5,450.82  | 809.47   | 3,564.00 | 7,535.65  | 4,332.71  |
| E      | 5    | 336lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 6,592.78                        | 10,778.62 | 3,161.81 | 5,667.75 | 12,764.81 | 9,559.69  |
| E      | 6    | 504lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 6,317.44                        | 12,504.94 | 7,128.00 | 8,643.94 | 14,367.37 | 9,547.81  |
| E      | 7    | 560lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 7,439.29                        | 11,542.23 | 5,177.18 | 9,946.59 | 13,597.94 | 10,965.71 |
| E      | 8    | 280lbs. sulphate of ammonia,<br>20% N.                                                                                                                   | 6,761.12                        | 10,130.03 | 5,456.65 | 7,789.47 | 11,320.94 | 8,933.29  |
| E      | 9    | No fertiliser .....                                                                                                                                      | 7,194.97                        | 4,455.00  | 570.71   | 1,071.53 | 6,991.23  | 3,144.71  |
| E      | 10   | 112lbs. sulphate of potash .                                                                                                                             | 9,677.25                        | 2,227.50  | —        | 43.31    | 5,531.62  | 1,806.75  |
| E      | 11   | 224lbs. sulphate of potash .                                                                                                                             | 17,208.53                       | 8,496.53  | 1,386.00 | 943.41   | 8,083.13  | 3,168.00  |
| E      | 12   | 392lbs. sulphate of potash .                                                                                                                             | 8,142.31                        | 4,776.75  | 1,070.44 | 259.94   | 5,791.50  | 1,967.62  |
| E      | 13   | 560lbs. sulphate of potash .                                                                                                                             | 11,505.66                       | 2,326.50  | 860.62   | 816.75   | 6,039.00  | 1,899.56  |
| E      | 14   | 280lbs. sulphate of potash .                                                                                                                             | 3,441.71                        | 1,045.32  | 99.00    | 267.88   | 4,251.18  | 1,921.76  |

The underlined rows are the test rows.



TABLE I—continued.

| Block. | Row. | Fertiliser Applied, Rate per Acre.                                                          | Yearly Yields in Lbs. per Acre. |          |           |           | Average Yield per Acre per Lbs. | Bushel Cases Calculated at 50lbs. net. |
|--------|------|---------------------------------------------------------------------------------------------|---------------------------------|----------|-----------|-----------|---------------------------------|----------------------------------------|
|        |      |                                                                                             | 1927.                           | 1928.    | 1929.     | 1930.     |                                 |                                        |
| B      | 1    | 168lbs. 36% W.S. phosphate                                                                  | 2,825-00                        | 366-66   | —         | —         | 1,588-83                        | 31-78                                  |
|        | 2    | 336lbs. 36% W.S. phosphate                                                                  | 338-83                          | —        | —         | —         | 788-86                          | 15-78                                  |
| B      | 3    | 504lbs. 36% W.S. phosphate                                                                  | 727-50                          | 15-00    | —         | —         | 1,189-25                        | 23-76                                  |
|        | 4    | 672lbs. 36% W.S. phosphate                                                                  | 960-00                          | 7-50     | —         | —         | 1,362-28                        | 27-24                                  |
| B      | 5    | 896lbs. 36% W.S. phosphate                                                                  | 1,867-50                        | 157-50   | —         | —         | 1,779-44                        | 35-59                                  |
|        | 6    | 1,120lbs. 36% W.S. phosphate                                                                | 502-50                          | 67-50    | —         | —         | 1,096-25                        | 21-92                                  |
| B      | 7    | 560lbs. 36% W.S. phosphate                                                                  | 1,316-67                        | 50-00    | —         | —         | 4,322-00                        | 86-44                                  |
|        | 8    | No fertiliser .....                                                                         | 2,385-00                        | 180-00   | —         | —         | 5,197-44                        | 108-95                                 |
| B      | 9    | 672lbs. 36% W.S. phosphate                                                                  | 2,272-50                        | 255-00   | —         | —         | 4,439-35                        | 88-79                                  |
|        | 10   | 1,344lbs. 36% W.S. phosphate                                                                | 2,895-00                        | 1,357-50 | —         | —         | 4,446-67                        | 88-93                                  |
| B      | 11   | 1,008lbs. 36% W.S. phosphate<br>112lbs. sulphate of ammonia<br>112lbs. sulphate of potash . | 3,187-50                        | 4,740-00 | —         | —         | 5,693-27                        | 113-86                                 |
|        | 12   | 672lbs. 36% W.S. phosphate<br>224lbs. sulphate of ammonia<br>224lbs. sulphate of potash .   |                                 |          |           |           |                                 |                                        |
| B      | 13   | 336lbs. 36% W.S. phosphate<br>112lbs. sulphate of ammonia<br>112lbs. sulphate of potash .   | 5,531-25                        | 6,018-75 | 9,585-94  | 11,282-81 | 6,768-11                        | 195-36                                 |
|        | 14   | 336lbs. bonedust . 40%<br>605lbs. bonedust . 40%<br>A.S.P., 3-25% N.                        |                                 |          |           |           |                                 |                                        |
| B      | 15   | 807lbs. bonedust, 40%<br>A.S.P., 3-25% N.                                                   | 3,137-50                        | 4,612-50 | 9,881-25  | 7,843-75  | 5,484-69                        | 109-69                                 |
| B      | 16   | 1,008lbs. bonedust, 40%<br>A.S.P., 3-25% N.                                                 | 8,437-50                        | 7,175-00 | 9,293-75  | 10,975-00 | 6,162-71                        | 123-25                                 |
| B      | 17   | 504lbs. bonedust, 40%<br>A.S.P., 3-25% N.                                                   | 5,250-00                        | 3,420-00 | 3,390-00  | 7,207-75  | 4,135-65                        | 82-71                                  |
| B      | 18   | No fertiliser .....                                                                         | 4,762-50                        | 618-75   | 6,684-88  | 5,006-25  | 6,159-81                        | 123-20                                 |
| B      | 19   | 302lbs. bonedust .<br>112lbs. sulphate of ammonia<br>112lbs. sulphate of potash .           | 10,200-00                       | 6,262-50 | 9,618-75  | 11,840-63 | 9,209-69                        | 184-19                                 |
|        | 20   | 605lbs. bonedust .<br>224lbs. sulphate of ammonia<br>224lbs. sulphate of potash .           |                                 |          |           |           |                                 |                                        |
| B      | 21   |                                                                                             | 5,871-43                        | 7,848-21 | 5,025-00  | 9,739-28  | 5,716-02                        | 114-32                                 |
| B      | 22   |                                                                                             |                                 |          |           |           |                                 |                                        |
| E      | 3    | 112lbs. sulphate of ammonia,<br>20% N.                                                      | 3,836-25                        | 3,288-66 | 7,310-53  | 8,068-50  | 3,770-66                        | 75-41                                  |
| E      | 4    | 224lbs. sulphate of ammonia,<br>20% N.                                                      | 5,287-76                        | 3,458-81 | 9,887-62  | 8,294-34  | 5,286-94                        | 105-74                                 |
| E      | 5    | 336lbs. sulphate of ammonia,<br>20% N.                                                      | 12,387-37                       | 7,954-03 | 14,147-72 | 14,961-37 | 9,797-59                        | 195-95                                 |
| E      | 6    | 504lbs. sulphate of ammonia,<br>20% N.                                                      | 12,084-19                       | 8,619-19 | 14,718-88 | 24,273-56 | 11,819-98                       | 236-40                                 |
| E      | 7    | 560lbs. sulphate of ammonia,<br>20% N.                                                      | 11,926-59                       | 7,122-18 | 14,084-21 | 20,126-12 | 11,192-80                       | 223-86                                 |
| E      | 8    | 280lbs. sulphate of ammonia,<br>20% N.                                                      | 11,425-76                       | 5,404-23 | 13,146-62 | 14,873-29 | 9,519-14                        | 190-38                                 |
| E      | 9    | No fertiliser .....                                                                         | 1,473-35                        | 87-35    | 486-76    | 564-88    | 2,599-05                        | 51-98                                  |
| E      | 10   | 112lbs. sulphate of potash .                                                                | 624-94                          | —        | —         | —         | 2,488-92                        | 49-78                                  |
| E      | 11   | 224lbs. sulphate of potash .                                                                | 2,020-76                        | 605-65   | —         | —         | 5,239-00                        | 104-78                                 |
| E      | 12   | 392lbs. sulphate of potash .                                                                | 1,095-19                        | —        | —         | —         | 2,887-97                        | 57-76                                  |
| E      | 13   | 560lbs. sulphate of potash .                                                                | 2,673-00                        | —        | —         | —         | 3,265-13                        | 65-80                                  |
| E      | 14   | 280lbs. sulphate of potash .                                                                | 2,178-00                        | —        | —         | —         | 1,650-61                        | 38-01                                  |

The underlined rows are the test rows.



TABLE II.

| Block. | Row. | Fertiliser Applied, Rate per Acre.                                                        | Yield in lbs. per Acre, 1930. | Bushel Cases Calculated at 50lbs. net. |
|--------|------|-------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------|
| B      | 1    | 168lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 5,156-25                      | 103-12                                 |
| B      | 1    | 168lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 4,537-00                      | 90-74                                  |
| B      | 2    | 336lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 5,756-25                      | 115-12                                 |
| B      | 2    | 336lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 1,875-00                      | 37-50                                  |
| B      | 3    | 504lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 7,762-50                      | 155-25                                 |
| B      | 3    | 504lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 7,856-25                      | 157-12                                 |
| B      | 4    | 672lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 5,550-00                      | 111-00                                 |
| B      | 4    | 672lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 11,025-00                     | 220-50                                 |
| B      | 5    | 896lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 5,400-00                      | 108-00                                 |
| B      | 5    | 896lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 13,181-25                     | 263-62                                 |
| B      | 6    | 1,120lbs. 36% W.S.P. and 560lbs. sulphate of ammonia .....                                | 7,903-12                      | 158-06                                 |
| B      | 6    | 1,120lbs. 36% W.S.P. and 12 tons stable manure .....                                      | 8,268-75                      | 165-37                                 |
| B      | 7    | 560lbs. 36% W.S.P. and 560lbs. sulphate of ammonia.....                                   | 11,237-50                     | 224-75                                 |
| B      | 7    | 560lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 26,740-62                     | 534-81                                 |
| B      | 8    | 560lbs. sulphate of ammonia .....                                                         | 6,600-00                      | 132-00                                 |
| B      | 8    | 12 tons stable manure .....                                                               | 5,381-25                      | 107-62                                 |
| B      | 9    | 672lbs. 36% W.S.P. and 560lbs. sulphate of ammonia .....                                  | 10,875-00                     | 417-50                                 |
| B      | 9    | 672lbs. 36% W.S.P. and 12 tons stable manure .....                                        | 3,323-12                      | 66-56                                  |
| B      | 10   | 1,344lbs. 36% W.S.P. and 560lbs. sulphate of ammonia .....                                | 14,512-50                     | 490-25                                 |
| B      | 10   | 1,344lbs. 36% W.S.P. and 12 tons stable manure .....                                      | 8,531-25                      | 170-62                                 |
| B      | 11   | 1,008lbs. 36% W.S.P. and 392lbs. sulphate of ammonia and 112lbs. sulphate of potash ..... | 14,325-00                     | 286-50                                 |
| B      | 11   | 1,008lbs. 36% W.S.P. and 112lbs. sulphate of potash and 6 tons stable manure .....        | 14,488-75                     | 289-77                                 |
| E      | 10   | 112lbs. sulphate of potash and 280lbs. sulphate of ammonia .....                          | 3,102-00                      | 62-04                                  |
| E      | 10   | 112lbs. sulphate of potash and 434lbs. blood manure.....                                  | 752-40                        | 15-05                                  |
| E      | 11   | 224lbs. sulphate of potash and 560lbs. sulphate of ammonia .....                          | 9,487-50                      | 189-75                                 |
| E      | 11   | 224lbs. sulphate of potash and 868lbs. blood manure.....                                  | 3,900-00                      | 79-20                                  |
| E      | 12   | 392lbs. sulphate of potash and 560lbs. sulphate of ammonia .....                          | 8,893-50                      | 177-87                                 |
| E      | 12   | 392lbs. sulphate of potash and 868lbs. blood manure.....                                  | 4,224-00                      | 84-48                                  |
| E      | 13   | 560lbs. sulphate of potash and 560lbs. sulphate of ammonia .....                          | 11,764-75                     | 235-29                                 |
| E      | 13   | 560lbs. sulphate of potash and 868lbs. blood manure.....                                  | 6,583-50                      | 131-67                                 |
| E      | 14   | 280lbs. sulphate of potash and 560lbs. sulphate of ammonia .....                          | 6,583-50                      | 131-67                                 |
| E      | 14   | 280lbs. sulphate of potash and 868lbs. blood manure .....                                 | 6,138-00                      | 122-76                                 |

As in Table I., the underlined are test rows.

## COW JUDGING COMPETITION.

During the adjournment for luncheon at the Pruning Competitions held at Mypolonga on June 4th, a Cow Judging Competition was conducted at Mr. S. Cheetham's dairy, under the auspices of the local Branch of the Agricultural Bureau. Nineteen competitors entered. Mr. L. Haynes won the adult section and Master H. Rowley was awarded first place in the Junior Section.

Mr. P. H. Suter (Senior Dairy Instructor), who acted as judge, expressed pleasure at the action of the Branch in organising the Competition—the first of its kind which had been held. Such tests of skill, he said, would do much towards inducing the young people to take a live interest in animal husbandry, and it was a lead which could be well followed by other Branches of the Bureau in dairying centres.

So successful was the Competition that it was decided to make this an annual fixture, and to stimulate further interest Mr. Suter has donated £2 2s. as a first prize for next year's Competition, and Messrs. T. Dodd and J. O'Brien offered 10s. 6d. each for a second prize.



## SOURSOB TROUBLES.

[By A. R. HICKINBOTHAM, B.Sc. (Chemist) and W. G. BENNETT, B.V.Sc. (Veterinary Officer), Roseworthy Agricultural College.]

### INTRODUCTION.

The soursob (*Oxalis cernua*), which originally came from South Africa, and was introduced here as a garden plant, has established itself so well locally that it now forms the most prominent part of many pastures during the winter months. One often hears it referred to as a useful pasture plant that provides an abundance of herbage in the early winter months; at the same time it is regarded with suspicion because of its content of oxalic acid, a substance poisonous to stock.

From chemical considerations, and from observation, it was thought that soursob had an influence on the occurrence of twin pregnancy disease in sheep and milk fever in cattle; that is, that soursob grazing could be a predisposing factor in both diseases. To test this theory with regard to sheep, a good deal of investigation has been conducted at the College this year, and in several cases sheep have been treated on neighboring farms. It will probably not be possible to complete the investigation of certain phases of the work this year, but enough has been done to assert with confidence—

- (1) That twin pregnancy disease (toxæmia of pregnancy) is accentuated by grazing ewes in lamb upon soursob and a large proportion of losses could be prevented by avoiding soursob grazing;
- (2) that early treatment in such cases as do occur with ewes approaching lambing will give good results;
- (3) that soursob poisoning in general is successfully treated by the administration of suitable calcium compounds.

### SOURSOB AS A FODDER PLANT.

An analysis of soursob plants, taken when about three-quarters grown, gave the results set out in Table I., in which, for comparison, the analyses of young barley, lucerne, and mixed pasture are also given.

TABLE I.—Composition of Green Fodders.

| Percentages—          | Water. | Crude Protein. | Crude Fat. | Crude Carbohydrate. | Crude Fibre. | Ash. | Oxalic Acid. | Starch Equivalent. |
|-----------------------|--------|----------------|------------|---------------------|--------------|------|--------------|--------------------|
| Soursobs . . . . .    | 92     | .83            | .28        | 3.55                | .98          | .71  | 1.65         | 4.0*               |
| Green barley . . . .  | 81     | 2.5            | .5         | 8.8                 | 5.6          | 1.6  | —            | 9.6                |
| Green lucerne . . . . | 76     | 4.5            | .8         | 9.3                 | 7.8          | 2.2  | —            | 9.1                |
| Mixed pasture . . . . | 80     | 3.5            | .8         | 9.7                 | 4.0          | 2.0  | —            | 11.1               |

(\*Assuming complete digestibility.)

The sap of all plants is acid, but the amount present is generally small, and, further, the acids usually occurring are not nearly so "strong" or "active" as oxalic acid is. The oxalic acid in soursobs appears to be present to a large extent as free acid, whereas in other plants the acids occur mostly as salts and acid salts, and are, therefore, less active.

In three-quarter-grown soursobs the total oxalate content was 1.65 per cent. of the green plants. Of this, nearly one-half (.70 per cent. of green plant) was present as free acid, the remainder being insoluble in water, and probably occurring in the plant as calcium oxalate. In the presence of excess hydrochloric acid (as in the later stages of







spectacular, and recovery often occurs within a few minutes. The explanation is that, in building the skeleton of a foetus, there is a steady drain on the calcium of the blood. This drain is greatly increased as soon as the milk supply begins (milk is rich in lime), and the animal goes down with milk fever. By adding calcium to the blood normal conditions are quickly re-established and a cure effected. The older treatment of pumping up the udder produces the same results indirectly and much less rapidly.

The etiology of twin pregnancy disease does not appear to be so simple. It is stated that any lack of calcium in the blood will restrict the function of the liver in removing poisonous waste products, and any condition of the animal likely to bring about a lowered calcium content in the blood will necessarily give rise to symptoms of poisoning (toxaemia).

Among stock-breeders the term "twin pregnancy disease" is used to include two diseases, known for example in New Zealand as "Ante-partum paralysis" and "Lambing sickness." Both occur locally, the former being characterised by fatty degeneration of the liver and other organs, is more commonly met with, and is correctly named Toxaemia of Pregnancy. The latter condition, on which data is scarce, appears to be akin to milk fever.

Symptoms of milk fever in cattle develop when the calcium content of the blood falls below a critical point, and this sometimes occurs before calving. In sheep this trouble seldom occurs after the lamb is dropped, but high producing ewes, especially of the larger breeds and with twin lambs, do frequently suffer from milk fever after lambing, and, as stated, this trouble is sometimes included under the term "twin pregnancy disease."

There seems no reason to suppose that sheep do not suffer from ante-partum milk fever; in fact, considering that sheep produce relatively little milk compared with cows, it might be expected that ante-partum milk fever in ewes would be more common than post-partum trouble. However, so far as experience goes, we have met no case of ante-partum milk fever in sheep not complicated by toxaemia of pregnancy. The question arises whether these two diseases exist—generally more or less associated with each other—or whether toxaemia of pregnancy is actually ante-partum milk fever in the ewe. Nothing in our experience negatives this suggestion, and there is a good deal of evidence to indicate that they are closely allied.

However this may be, a similarity between "twin pregnancy disease" and milk fever emerges when the conditions leading up to these diseases are considered. Milk fever is discussed above. "T.P.D." often occurs when the ewe is carrying only one lamb, but it is more frequent, as the name implies, when two are carried. In this case the drain on the blood calcium is much greater for two foetuses than for one, and ewes with two lambs are most likely to succumb.

#### OXALIC ACID REDUCES BLOOD CALCIUM.

If, after an animal has been poisoned with oxalic acid from soursobs, the organs are examined for oxalic acid, it will be found—

- (1) That in the stomach *free* oxalic acid occurs;
- (2) in all other organs—liver, kidneys, bladder, &c.—the oxalic acid occurs in combination with calcium as crystals of *insoluble calcium oxalate*.

Thus the oxalic acid which passes through the stomach walls and enters the blood combines with the *calcium of the blood* precipitating it as insoluble calcium oxalate, and completely removing it as far as its normal functions are concerned.

The absorption of oxalic acid, therefore, reduces the amount of calcium in the blood. Consequently, if animals predisposed to "twin pregnancy disease," with a somewhat lowered calcium content in the blood, are grazed on soursobs, the oxalic acid contained in them further lowers the calcium content—probably below the critical point when the animal goes down. In many cases the animal would escape a critical sickness if the oxalic acid were avoided.



## ILLUSTRATIONS.

1. In one instance a flock of sheep, due to lamb in a few days, were changed from sown green feed to a pasture of barley-grass and soursob. Next morning eight ewes were dead and about 20 more were showing symptoms of poisoning. *Post-mortems* on some of the sheep showed twin lambs in two and fatty degeneration and the characteristic T.P.D. smell in all. Drenching the remainder with calcium cleared up the trouble, including a ewe that had been unconscious for 24 hours, without further loss.

2. In another case eight deaths were reported and treatment asked for. This farm was visited. Some sheep showed unmistakable T.P.D. symptoms; others were apparently typical soursob cases. All cases were ewes close to lambing; dry ewes, wethers, and ewes with lamb at foot were unaffected. One ewe, very low and showing typical T.P.D. symptoms, was treated subcutaneously and later drenched. She was walking within 24 hours, but died the following night. *Post-mortem* showed peeling of the stomach lining (oxalic acid). Another showing typical acid poisoning symptoms and paralysis of the front legs recovered within two hours of drenching.

These two instances, selected from several similar cases, illustrate that soursob accentuates T.P.D.

3. Some 15 ewes due to lamb at different times within a month, and five wethers, were placed in a yard and fed heavily on chaff with the object of causing T.P.D. if possible, without any soursob complication. This treatment produced cases within one week, while all the wethers remained healthy. About half the cases showed typical T.P.D. symptoms, but the rest were not typical, and the material was therefore not very satisfactory to work on.

In all, seven cases occurred; four were typical and were treated with calcium as a drench or subcutaneously. Of these, one was lost, two recovered, and the other, after improving considerably; died after two days; *post-mortem* showed that the foetus had been dead for at least a day. Both dead ewes showed typical T.P.D. anatomical changes. All of the others were lost, and *post-mortems* disclosed causes of death other than T.P.D., though fatty degeneration had commenced.

These cases show the calcium treatment effective (in part at least) in T.P.D. cases not complicated by oxalic acid poisoning. Probably results would have been better under more natural conditions.

4. In several cases dry ewes and wethers have been placed on soursobs with the object of producing poisoning. About 10 cases occurred and all recovered on drenching.

It might be added that soursob poisoning occurs about 10 times in ewes for every once in wethers—this is a common observation. The ewes, because they are breeding, tend to have a low calcium tension of the blood and are, therefore, more susceptible.

## TREATMENT.

*Soursob Poisoning.*—The drench that has given good results consisted of—

Calcium chloride—5 grams=level teaspoon.

Ammonium chloride—5 grams=level teaspoon.

Water— $\frac{1}{2}$ -1 pint.

The calcium chloride renders any oxalic acid in the stomach insoluble so that it can do no further harm, and the remainder passes easily through the stomach wall and corrects the calcium content of the blood. The ammonium chloride is used to reduce bloating and for its tonic effects.

*Twin Pregnancy Disease.*—If taken sufficiently early the same drench has proved successful. (In bad cases hypodermic injection made subcutaneously has given a rapid response, the animal being considerably brighter in 10-15 minutes, but the animals developed serious sores where the injections were made. It is intended to try future cases intravenously, as in the milk fever treatment.)



## CONTROL.

*Precautionary measures against soursob poisoning* (this applies to all sheep, but particularly to ewes in lamb).

1. Lime in drinking water (if taken) will prove of benefit.
2. On the first sign of trouble drenching the flock will save losses. This treatment cannot be regarded as at all permanent, as all the calcium will be eliminated in probably two days.
3. Hungry sheep must not be placed on soursobs. Feeding with oats damped with calcium chloride (about 1oz. to six sheep) and molasses before placing on soursob has been effective.
4. A change to grazing on lucerne or clovers (which are rich in lime).
5. Sheep from areas where soursobs do not occur should be got used to them gradually.
6. If possible sheep should be removed to other pasture than soursobs at least once every two weeks.

Regarding point 1, the addition of lime to drinking troughs has, in a local herd, greatly reduced the incidence of milk fever. This apparently has supplied sufficient calcium, and will lessen liability to the trouble, especially where the cows graze on soursobs.

Regarding points 3 and 4, fifty sheep were taken for experiment with these treatments, and divided as follows:—

- A. 20 were fed on oats damped with calcium chloride solution.
- B. 20 were grazed till satisfied on lucerne.
- C. 10 were fed on chaff.

Within 24 hours of placing the flock on soursobs one case of poisoning occurred, and 24 hours later another case developed—both were sheep from group C. No sheep of A or B showed any symptoms within 10 days.

*Control of T.P.D.*—It is now well known that exercise and sparse rations up to the time of lambing greatly reduces losses from this cause. Our work on this point is not sufficiently advanced to state definite conclusions (and further material is not available this year), but it appears that the addition of a calcium complex to the ration will at least reduce the possibility of trouble. If such cases as occur are treated by drenching as above when symptoms first appear, it is considered that a proportion of cures will result. Past experience has been that only about 2 per cent. of T.P.D. cases recovered, but this year two out of four similar cases recovered when treated.

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## IRRIGATION INVESTIGATIONS IN THE MILDURA AND RENMARK DISTRICTS.

[A Paper read by Mr. A. V. LYON, M.Agr. Sc. (Commonwealth Research Station, Merbein), at the Conference of River Murray Branches of the Agricultural Bureau, Renmark, June 18th, 1931.]

### GENERAL.

The general method of control of the distribution of irrigation water in a Murray River settlement provides that an Advisory Board, on which the settlers have the major representations, decides the periods of the year at which irrigation water is made available to the settler, and that the method by which the water is to be applied, and the durations of the irrigations, is essentially in the hands of the settler.

### THE PRESENT POSITION.

The results of the irrigation practices in many of our irrigation settlements are by no means satisfactory. Associated with the periodicity or frequency of watering, we have had errors arising from a protracted period between irrigations; and, on the other hand, the methods of irrigation have been such, that salt and seepage problems have become acute, and are still increasing, in lands liable to these troubles.

Temporary water shortages, unless extreme, fortunately leave no permanent effects on the health of the vine, which usually recovers in one or two seasons, during which decreased yields and low-quality products are in evidence. With citrus trees, temporary shortages of water have more prolonged effect, and may entail reconditioning of the trees by cutting out dead wood.

Salt and seepage problems are much more serious, and have permanently decreased productivity, and in extreme cases, rendered the land wholly unproductive. In less acute cases, crop losses may be periodic, vines and trees temporarily going out of condition when spells of very hot weather are experienced or irrigation has been unduly delayed.

It will thus be seen that the problem is twofold, having to do with both the method and the frequency of irrigation.

The investigations in progress have been designed to secure information on each of these two problems.

Data is being secured in the Renmark, Curlwaa, and Mildura districts, on a number of selected sites, representing the major soil types. The investigation has taken the form of measurements of soil moisture, in the periods between irrigations; and of the immediate changes in soil moisture, as a result of irrigations. The latter includes the location of the spread of water from an irrigation furrow, represented by a soil moisture profile in a vertical section of the soil across the furrow.

Results show that the soil moisture changes over September, October, and November period (12 weeks) are comparable to the changes occurring in each of the two subsequent five-week periods between irrigations. This is particularly interesting, in that present practice includes, on the major portion of our horticultural lands, irrigation within this 12-week period. A relatively low moisture content at harvest is also disclosed.

The total changes in soil moisture from August 8th to December 2nd, 1929, on a deep loam soil were also measured. On this occasion the growth curve of the vine shoots was recorded. The results observed on the vine and the soil-moisture measurements indicate that suitable soil-moisture conditions were maintained throughout the



period, without the application of irrigation water, and confirms the results obtained the previous year. It is of interest to note, also, that the major soil-moisture changes occur within 18in. of the surface.

Soil moisture changes at two Renmark sites were taken during the 1930-31 season. Again we have indications of limitation of the depth of soil-moisture changes. A high moisture content throughout the season, during which the usual irrigations were supplemented by regular rainfall, is a feature of the irrigation practice during this season.

Irrigation on Renmark soils has a marked influence on the water table. In the case of type 3 soil, the rise of the free water levels closely follows the irrigation. In the type 6 soil there is considerable delay, probably due to the heavy clay subsoil above the free water surface.

Soil-moisture profiles, resulting from furrow irrigation in different soil types, vary with the soil type. These show that the soil profile, particularly increases in the clay content with depth, profoundly affect the results from irrigation, tending to increase lateral and decrease the natural vertical penetrations.

#### SOIL MOISTURE PROFILES.

The study of soil-moisture profiles from one furrow discloses that the shape of the profile changes as irrigation is prolonged, the lateral distribution showing a relative increase. An outstanding result on the data secured is the advisability of three or more furrows for irrigating, to secure adequate and economical wetting of the soil. In the common case of one-furrow irrigation per vine row of 10ft. spacing, the surface soil is wetted only when irrigation is prolonged until the downward penetration is retarded or stopped by a layer of clay, and the lateral penetration has proceeded until it meets the profile of the adjoining furrow. This necessitates accumulation of free water. A similar result, of lesser extent, prevails with two-furrow irrigation, as the natural turnip-shaped profile is not sufficient in lateral measurement to meet the requirements until penetration is hastened by retardation or stoppage of the downward flow. With three-furrow irrigations, for vines spaced at approximately 10ft., the top-shaped profile, resulting from an increased clay content with depth, is sufficiently wide to wet the top soil without accumulations of free water.

The measurements of lateral penetration suggest the suitability, for many of our soils, of furrows spaced at approximately 3ft.

This spacing is now being applied to horticultural lands with plants of wide row spacing, such as citrus and stone fruits. In the Mildura district, the term "multiple furrow system" is arising, and is displacing the former practice of irrigating in furrows widely spaced.

#### SOAKAGE RATE.

The time necessary for complete wetting of the top soil, from irrigation furrows at 3ft. spacings, may be stated at 12 hours or less for the majority of soil types, the heavy clays being possible exceptions. A reduction to half this time is possible on some soils. On small sections of the furrow, into which the introduction of the water may be almost simultaneous and the soakage rate measured, the initial absorption of water is fairly rapid, with a very decided decrease in the soakage rate as irrigation proceeds.

Measurements have been taken in reference to the clay loam (blue bush) soils in the Mildura district, on which it had previously been ascertained that the soakage rate was reduced to approximately one-third of the initial amount after an interval of three hours. Irrigation water was delivered into the furrow at the rate of 1gal. in 13 secs. and at this rate the water reached the end of a 6-chain run in 6 hours. The delivery was then reduced to one-third (1gal. in 40 secs.), with the result that the water at the end of the furrow receded slightly (1yd. in one hour), and within the next three hours receded 21yds. and recovered to the full length of the furrow. In the succeeding 12 hours, the water, without alteration of the delivery rate, remained in the full furrow



length without overflowing. The behavior of the water in two adjoining furrows, at 3 ft. spacings, showed no marked difference. In this instance, the measured rate of application is  $4\frac{1}{2}$  ac. in., a very considerable reduction on general practice.

Examination showed complete wetting of the whole of the upper 3 ft. of soil, excepting in places at the surface at the midline between the furrows. On this line, dry soil up to 10 in. wide and a few inches deep was in evidence intermittently. This result, and its subsequent application to a larger field, illustrates quite clearly the practicability of marked reductions in the duration of irrigation, and consequently in the amount of water used.

An additional advantage is a reduction of over-soakage, manifest under present practice on the higher portions of the irrigated tract. In this connection, it is essential to have suitable devices for control of the water flowing out of the irrigation ditch, and also to determine by trial the necessary alteration of the soakage rate, as irrigation proceeds, for the principal soil types.

#### FREE WATER.

It may be generally stated that present practices, considered in relation to the subsoils of the irrigated land, result in water logging of portions of each irrigation settlement. In certain soils, such as the Type 3 of the Renmark area, excessive watering appears to have no harmful effect, apart from unnecessary expense in pumping and the probable wastage of portion of the plant foods.

In the case of other heavy soils, such as Type 6, Renmark, excessive waterings result in the formation of surface pools, in the removal of which evaporation probably contributes. As shallow rooting of horticultural plants is a characteristic of such soils, there appears no necessity for deep penetration of irrigation water. In soil moisture determinations on an extreme Type 6 soil at Renmark, three-furrow irrigation for 24 hours wetted the soil to its full field capacity, and no decided increase in soil moisture resulted from 48 hours flooding. The reservation must be made that these results may not hold in a dry, hot season, in which loss of water to greater depths in the subsoil is possible. So the problem again resolves itself into one of unnecessary expense, with the added probability of interference with the plant by the total submergence of roots, which, in the Renmark district, has been observed to prevail for periods up to seven days after irrigation.

On lands which are potentially salty, exemplified in portions of the Mildura, Berri, and Barmera districts, it is certain that excessive waterings are making the main contributions to the salt devastation, which is increasing each year. The present practice, by which free water surface is raised at each irrigation and amelioration sought by agricultural drains, is not always satisfactory.

The following conditions of agricultural drainage in the Mildura district have come under notice:—

- (i.) Drains laid in a permeable subsoil layer at depths of approximately 4 ft. with free water held by an impermeable or semi-impermeable layer at a greater depth. Such drains function only when the water level is raised to the level of the drains.
- (ii.) Drains laid in a soil layer sufficiently impermeable to form a temporary or perched watertable, which is usually accompanied by a more impermeable layer, and a more permanent watertable at a greater depth. Drains under these conditions function for a limited time following irrigation, removing only the upper surface of free water.
- (iii.) Drains laid on the impermeable layer in soils which are limited to one such layer. The effective removal of free water is possible under these circumstances.

In the absence of a complete survey, no attempt is made to define the relative occurrence of these three common cases. The examples are cited to illustrate the importance of a study of the soil profile and of the occurrence of free water in relation to irrigation.



# Scientific Farming!

**THAT** is the only proper response to present troubles—**THAT** is the road to solvency and restored prosperity. . .

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Science and Economy dictate the liberal use of

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for it lowers costs by increasing yields.





in all agricultural drainage considerations. Of the cases cited, only one, Case (iii), effectively provides against salting.

For removal by downward leaching of salt, provision must be made for removal of excess free water; or, alternatively, limitation of the irrigation supplies to the extent that free water occurs for brief periods, if at all. It is in these directions that relief from the menacing salt troubles might be found, as limitation of the duration of irrigation tends to limit free water movement to a downward direction.

#### COMMUNITY IRRIGATION PRACTICE.

The results of irrigation investigations and observations are being utilised in community irrigation practice.

The general practice, illustrated by the record of irrigation at Merbein over a period of years provides for water service at the following periods:—

1. A winter irrigation, completed before the end of August.
2. An early spring irrigation, completed before the end of October.
3. A late spring irrigation, completed on approximately December 20th.
4. A mid-summer irrigation, commencing in late December and continuing until early irrigators have received an additional (pre-harvest) irrigation.
5. An autumn special (late February or March) for citrus and late grapes.
6. A late autumn (usually in April, on completion of harvest) for growth of cover crops.

Occurrence of rain necessitates slight alterations, and heavy rains may warrant omission of an irrigation. A common example is the omission of the winter irrigation in seasons of heavy winter rainfall.

It has been shown that the soil moisture changes during spring are insufficient to warrant an early spring irrigation. Persistence in this irrigation must be attributed to a fundamental fault of community irrigation, in that up to four weeks is necessary for the service of the whole settlement. As a result, late irrigators take water in October, not because it is needed at the time, but to enable their plants to carry over until they are again served near the termination of the irrigation commencing in late November. On the other hand, early irrigators can and do forego the October watering, as they are first served at the succeeding period. The utilization of this fact by growers in increasing numbers is a recent change in irrigation practice in the Mildura district, and has resulted in a marked decrease in the total water used at the early spring irrigation.

In reference to the requirements in the Autumn period, the present arrangements are entirely unsatisfactory, as a special charge at the Mid-harvest irrigation contributes to faulty practice. Growers frequently withhold irrigation on land that is in need of it, until the Late Autumn irrigation, when water is again available under the annual charge. Excepting for revenue purposes, there are no advantages in this, as in the majority of cases, the Mid-Autumn irrigation would suffice for the season in lieu of the present late autumn service, which is usually not received until wilting of leaves has occurred.

#### CONCLUSION.

It is appropriate to point out, in conclusion, that any steps which tend to shorten the individual period for irrigation tend also to shorten the community period. Under present conditions, in many of the settlements, the decision to irrigate must be made five weeks in advance of the anticipated service to the final irrigators. With a shorter community period, a delay in the decision is practicable, useful rains in the intervening period frequently resulting in decided savings in both settlers' labor and irrigation service. As the efficient minimum service is thus accompanied also by preservation of capital value of the irrigated lands, decreased distribution costs, and the possibility of utilising natural rainfall to a greater extent, decreased application of irrigation water may be stated as a first essential in overcoming existing soil difficulties and in reducing costs.



## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

## CONFERENCE OF RIVER MURRAY BRANCHES.

Branches of the Agricultural Bureau situated in the irrigated districts of the River Murray met in Conference at Renmark on June 18th. There were present Professor A. J. Perkins (Director of Agriculture), Messrs. G. Quinn (Chief Horticultural Instructor), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Poultry Expert), N. S. Fotheringham (Manager Berri Orchard), E. L. Griffiths, E. Leishman, J. B. Harris, F. R. Arndt, H. Beriman (District Instructors), H. C. Pritchard (General Secretary), F. C. Richards (Assistant Secretary Agricultural Bureau), Professor J. A. Prescott (Waite Agricultural Research Institute), and A. V. Lyon (Merbein Research Station), and delegates from the Berri, Renmark, Waikerie, Block E, Ramco, and Light's Pass Branches.

## OPENING CEREMONY.

In welcoming Departmental officers and delegates from visiting Branches, Mr. O. Weste (Chairman) said:—We as primary producers fulfil a very important part in the rehabilitation of our country's financial stability in so far as the goods we produce for export comprise about 80 per cent. of our production, and in this way create new wealth to the country's coffers. We gather together once a year in conference to listen to the deliberations of those who have made a deep study of their subjects, and it would be hard to get a better combination of interesting subject matter than we have with us to-day on the agenda, nor can we have better men to deal with their subjects. The Agricultural Bureau system is of vital importance to the growers all over the State, whether it is wheat, wool, dried fruits, and some of the most far-reaching and important matters dealing with the agricultural and horticultural industries have been brought about by the influence of this institution. There is no reason why membership should not be 100 per cent. of primary producers, instead of which we have a comparatively small band of willing workers, who feel it a deep duty not only to keep in touch with all matters of interest, both practical and scientific, but who willingly distribute this information throughout the land. I would specially like to welcome the Director of Agriculture, who so kindly consented to open this Conference, and those who have so willingly prepared papers, and hope their efforts will be appreciated by those present. I would also like to say a word of deep regret for the illness of our very dear friend, Mr. H. S. Taylor, and I am sure we all wish him a speedy recovery.

## THE DIRECTOR'S OPENING ADDRESS.

In his opening address, Professor Perkins (Director of Agriculture) said:—In the first place I must express regret at the circumstances that have thrown upon me the responsibility of delivering the Opening Address at this Conference. The original intention was, as your agenda shows, that it would be delivered by your local representative on the Advisory Board of Agriculture, Mr. H. S. Taylor. We all regret his unfortunate absence to-day, and I know that I shall be rightly interpreting your feelings in expressing our deep sympathy with him in his illness, and our hope that he may soon be on the way to recovery.

## TRIBUTE TO MR. H. S. TAYLOR.

I think I can say without any exaggeration that in the length and breadth of the Murray Valley there is no man who has labored more unselfishly and more successfully for the progress and development of the River settlements than Harry Taylor. I have had the privilege of his acquaintance for a number of years, and I do not hesitate to state that in the course of a tolerably long life I have not met a whiter man; nor do I



think that I shall do so in the few years that remain to me. His instinctive reaction has always been towards the weaker side; he has shown himself the sworn champion of those least able to defend themselves, and the last defender of many a lost cause. If I had to describe him as briefly as possible I should say that essentially he was an idealist, whose idealism was tempered by a considerable fund of shrewd common sense; and it is this happy combination that has made of him so valuable a public man to the district which he has elected to serve. It might be added, too, that although without guile, he combines the innocence of the dove and the wisdom of the serpent. And during the course of this Conference we shall miss not only the pithiness of his Opening Address, but in addition the illuminating comments which he has usually contributed to our debates. That he should be able to resume his normal activities at the earliest possible moment is the heartfelt wish of us all. Let me, too, apologise for the absence of the Minister, whose official duties unavoidably detain him elsewhere.

#### A COMPREHENSIVE AGENDA.

My experience of these Conferences extends back to a number of years; indeed, back to the earliest days of the Agricultural Bureau system, and I have observed that the most successful Conferences are usually held when times are hard in the country. In spite of recent improvements, they are none too bright at the present time, and logically we should anticipate a most successful Conference to-day. In this connection, I feel that I can congratulate you on the comprehensiveness of your agenda. In addition to the normal items, I notice that you are to have an address on "Water Penetration" by Mr. A. V. Lyon, who has, I understand, conducted research work on the subject at Merbein; and another address on "Soil Problems" by Professor Prescott, who is a world authority on the subject. I take it that both addresses will deal with matters of immediate importance to all of you.

#### THE DRIED AND CITRUS FRUITS POSITION.

Your main interests lie so much in the direction of dried fruit, that after a succession of depressing seasons, it must be highly gratifying to you all to find that your leaders and those best able to form an opinion on the matter are beginning to take an optimistic view of the dried fruit position. This means, of course, that overseas market prices are likely to be more favorable than those of recent years. It would seem that you owe this partly to the misfortunes of others in the shape of untimely frosts and generally unfavorable seasons; but partly, too, to improvement in quality and uniformity of your marketable produce. On the latter count you are to be congratulated on the local organization and co-operative spirit that have led to these results. Nor in this connection should the values of judicious propaganda and the search for new markets be overlooked. Under the influence of the new trade treaty our prospects on the Canadian market would appear to be very bright. I understand that the Export Control Board estimates that the 1931 exportable surplus of Australian dried fruits is not likely to exceed 30,000 tons, of which 10,000 tons will probably be absorbed by Canada and New Zealand. The latter should relieve the pressure on the London market and lead to a general improvement in mean prices.

Many of you, too, are interested in citrus fruit; and it must be highly gratifying to you to realise the dominating position which River fruit, and particularly South Australian River fruit, occupies on the markets of the Commonwealth. It is true that we are rapidly approaching a large Commonwealth surplus in citrus fruit, and that our overseas marketing problems in this direction have not yet been completely solved. The study of them, however, is in competent hands, and in the course of time we are entitled to anticipate the development of a successful export trade which will contribute materially to the wealth of the State.

I need not dwell upon the importance of high quality and uniformity of sample in produce intended for the markets of the world; a policy of slackness in this direction is likely to undermine the best efforts of those who are endeavoring to build up a successful export trade.



## SIDE LINES.

There is one other point on which I should like to say a few words. Except for the fact that in days of general unemployment they find themselves in continuous employment, there are very few primary producers to-day whose financial position is altogether comfortable, and in consequence there has been a more or less general tendency to look around and see whether sidelines might not help, when main lines are precariously situated. This is certainly the case of wheat farmers, who in increasing numbers are turning their attention to cows, sheep, pigs, and poultry, without, however, relaxing their efforts to grow wheat; and it is not only legitimate, but essential, that they should do so. But you, no doubt, consider yourselves specialists to an even greater extent than the average wheat-grower, and imagine that sidelines can help you but little. Personally, however, I cannot imagine that your orchards and vineyards should be entirely self-sufficing—there must be material, by-products that usually go to waste; there must be odd corners that could be exploited to some advantage. What these sidelines should be I am not prepared to discuss in detail, beyond stating that the association of live stock of any kind with crop growing has numerous indirect advantages apart from any profits it may bring. I notice that Mr. Anderson is to address you on poultry, and I hope he will convince you that poultry can do more than supply your breakfast requirements, although in these times the latter are not to be despised. Mr. Barlow, too, will be in attendance to give full information on the advantages of cows and pigs.

I have very much pleasure in declaring the Conference open, and I trust that your deliberations will be of advantage both to yourselves and the River districts as a whole.

## PRESENTATION TO MR. H. S. TAYLOR.

The high esteem in which Mr. H. S. Taylor is held by the Bureau was exemplified by a presentation of a fine clock and fountain pen, in the making of which the Chairman spoke as follows:—

In making this presentation on behalf of the River Branches of the Agricultural Bureau, I would like to say that no man on the River is held in higher esteem than is Mr. Taylor. We hold him in esteem not only as an authority on matters of horticulture and on matters of the history of organised marketing, but whatever matters he has taken into his heart he has delved right to the core of the matter and given us the deliberations of that vast brain of his. We hold him in very deep affection as a staunch friend—a friend who can be relied upon in any emergency, and as a journalist he is at his best when fighting for a just cause with his back to the wall.

We have seen him fighting for our industry, the very existence of which depended upon legislation being passed that did not find approval with one of our strong daily papers.

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He has crossed swords with many who have regretted it. But best of all, we like our peaceful idealist who has made his home a reflection of himself—in his garden to wander amid fruits and flowers, to retire to his library and listen for a while to that fund of literary wealth stored from the world's best works and retained by a master mind.

We wish Mr. Taylor to accept these gifts not because of their value, but because we feel a very deep gratitude to him, and we wish him to accept our appreciation in some small way of the work he has done for our Agricultural Bureau. Mr. Taylor has always been more than indulgent to his critics, and allowed them a degree of latitude not tolerated by any other paper, showing as it does the magnanimity of his nature. As a friend and councillor his long association with the Advisory Board stands to his everlasting credit, and we hope he will long continue to carry on the good work. The clock will remind him that time exists for rest as well as work; and the longer he rests, the longer will he enjoy the use of his fountain pen.

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### REPORT ON SULTANA PRUNING TRIALS, JUDGED ON CROP RETURNS.

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*[Held under the auspices of the Berri Branch of the Agricultural Bureau at the vineyard of Mr. P. M. Wilksch, of Berri, during the seasons 1928-1929, 1929-1930, and 1930-1931.]*

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[By N. S. FOTHERINGHAM, W. R. LEWIS, and F. R. ARNDT.]

The idea that in Pruning Competitions the crop produced, as well as the actual pruning of the Vines, should be taken into consideration, has for some time been the opinion of a number of Sultana growers, who hold to the belief that the pruning of this vine, both in general practice and at Pruning Competitions, has been based too much on theoretical standards, without sufficient regard being paid as to how the methods used by pruners affect crop returns.

The statement has also, at times, been made that neatness and symmetry often appear to be the chief objective of many pruners at Pruning Competitions, and that the vines are not always pruned in a manner to enable them to produce the highest crops in accordance with their strength.

The expression of such views during the past few years has led to some extent to greater uncertainty among Sultana growers as to pruning methods, and has made it desirable that these ideas should be tested, so that the effect that pruning methods have on crop returns should be more clearly understood.

#### THE WILKSCH CUP.

The present pruning trials owe their inception to the initiative of Mr. P. M. Wilksch, of Berri, who offered portion of his vineyard for the purpose of holding a Pruning Competition under the auspices of the Berri Branch of the Agricultural Bureau, in which the pruners would be judged according to the total weight of fresh fruit produced during the three consecutive seasons of 1928-1929, 1929-1930, and 1930-1931, but that the shape and general wellbeing of the vines at the end of that period should also be taken into consideration by the judges in giving their award.

As an incentive for growers to enter these pruning trials, Mr. Wilksch presented a silver cup for the winner of the Competition. The Berri Branch agreed to take charge of the Competition, and appointed Messrs. N. S. Fotheringham, W. R. Lewis, and F. R. Arndt to act as judges. To further encourage pruners to enter as competitors, the Berri Branch offered to give the sum of £2 2s. as a second prize.



## THE SITE OF THE EXPERIMENT.

The land chosen for the site of the experiment consisted of good, fertile, deep, sandy red loam. The vines were in good heart—strong and vigorous—and had been well pruned and cared for. During the first year that the experiment was in progress the vines were manured with 3 cwts. of blood and bone manure per acre, but during the two following years the only fertilisation that the land received was that given by the ploughing in of cover crops of peas and beans; but these, on account of the dry weather conditions, produced only a moderate amount of growth. Each competitor was given a row of 46 vines to prune, and he pruned the same row every year.

The nature of the soil and the general condition of the vines was practically the same for each row. The vines all received the same treatment in regard to fertilization, irrigation, and tillage operations, and the shoots were all tipped during the growing period on the "Voullaire" system—all of which work was performed by Mr. Wiksch.

## THE COMPETITORS.

The competitors who took part in the pruning trials were Messrs. B. H. Jungfer, G. H. Botttrill, E. R. Moss, A. G. Jarvis, J. R. Johnson, W. N. Ellis, A. W. Magarey, and L. A. Chapple. The vineyard numbers of the rows selected for the pruning trials ranged from 11 to 18, and in this report, with one or two exceptions, the competitors are referred to by the number of the vine rows they pruned.

## OBSERVATIONS ON PRUNING METHODS.

The judges attended the pruning trials each year, and observed the methods used by the various pruners. The chief points upon which information was obtained include:—

1. The number of fruiting canes left by each pruner per vine per year.
2. The number of spurs left by each pruner per vine per year.
3. The system of pruning adopted by the various competitors.
4. The approximate average number of fruiting buds left by each competitor per vine at the 1930 pruning trial.

In regard to the pruning methods used by the competitors, these resolved themselves into two main systems. Of these, the method of depressing the fruiting canes on to wires lower than the crown of the vine was adopted by Competitor No. 14, but the previous training of the vines did not make them suitable for this kind of pruning. The system adopted by the remainder of the competitors was that of choosing suitable fruiting canes and of twisting them on to the trellis wires, the chief difference between the competitors being in the number and length of the canes selected.

## METHODS USED BY PRUNERS.

Briefly stated, the main features of the pruning methods adopted by the various competitors were as follows:—

*Competitor No. 11.*—This pruner relied on numerous strong fruiting canes, averaging 7.3 canes per vine, and left more fruiting rods on the vines than any other competitor.

*Competitor No. 12.*—Made use of numerous fruiting canes of moderate length, which were on an average, shorter than those left by any of the other competitors, and averaged six canes per vine.

*Competitor No. 13.*—The fruiting canes selected by this competitor were long and strong and were tightly wound around the trellis wires after pruning. The number of fruiting canes used by this pruner was less than those of any other competitor, and averaged five per vine.

*Competitor No. 14.*—As previously stated, this competitor worked on the system of depressing the fruiting canes of the vines. As, however, the vines had previously been trained with crowns close to the bottom wire of the trellis, they did not lend themselves well to this class of pruning. The fruiting canes selected averaged 7.2 per vine.

*Competitor No. 15.*—Made use of a moderate number of well selected fruiting canes, ranging from three to seven per vine, and averaging 5.6 per vine.



**Competitor No. 16.**—This competitor chose numerous strong and fairly long fruiting canes, and averaged 6.1 canes per vine for his fruiting wood.

**Competitor No. 17.**—Selected a moderate number of fruiting canes, and averaged about 5.6 canes per vine.

**Competitor No. 18.**—This competitor relied on a fairly large number of well-selected rods for his fruiting wood. The number of canes left varied from about four to eight, according to the strength of the vines, and averaged 6.1 per vine.

#### WEIGHING THE FRUIT.

The fruit was weighed by Mr. Wilksch, who took every precaution to ensure that the weights were correctly taken.

The following is the record of the weight of fresh fruit produced during the course of the experiments:—

#### *Weight of Fresh Fruit in Lbs.*

| No. of Competitor. | 1929. | 1930. | 1931. | Total. |
|--------------------|-------|-------|-------|--------|
| 11 .....           | 2,178 | 1,957 | 803   | 4,938  |
| 14 .....           | 2,133 | 1,949 | 856   | 4,938  |
| 16 .....           | 2,215 | 1,804 | 782   | 4,801  |
| 18 .....           | 2,083 | 1,799 | 723   | 4,605  |
| 15 .....           | 1,995 | 1,756 | 685   | 4,436  |
| 13 .....           | 1,839 | 1,773 | 772   | 4,384  |
| 12 .....           | 1,683 | 1,823 | 643   | 4,149  |
| 17 .....           | 1,703 | 1,532 | 668   | 3,903  |

From the above figures it will be observed that the Competition resulted in a tie, as the two leading competitors—No. 11 (Mr. B. H. Jungfer) and No. 14 (Mr. A. G. Jarvis)—both secured the same weight of fresh fruit. The weight of fruit obtained by the majority of the competitors was high for the first two years, but fell off considerably during the 1931 season, which was a year of general low sultana yield throughout the Murray Valley. The aggregate weight of fresh fruit secured during the three years by the lowest competitor was 21 per cent. below that obtained by the highest.

#### EQUIVALENT ANNUAL AVERAGE WEIGHT OF DRIED FRUIT PER ACRE.

Worked out on an acreage basis from the foregoing figures, the average annual crop of dried fruit for each competitor for the three years, if calculated at the ratio of 3½lbs. of fresh fruit to 1lb. of dried, would represent the following weight in pounds:—

| No. 11. | No. 14. | No. 16. | No. 18. | No. 15. | No. 13. | No. 12. | No. 17. |
|---------|---------|---------|---------|---------|---------|---------|---------|
| 4,831   | 4,831   | 4,697   | 4,505   | 4,339   | 4,289   | 4,059   | 3,868   |

The relation of the number of fruiting canes left on the vines to the total weight of fresh fruit obtained by each competitor gives the following results. The number of spurs is also given, but no conclusions have been drawn therefrom:—

#### RELATION OF NUMBER OF FRUITING CANES TO CROP RETURNS.

| No. of Competitor. | Total Number of Fruiting Canes for Three Years. | Total Number of Spurs, Three Years. | Total Weight of Fresh Fruit, Three Years. | Order of Competitor in Relation to Crop Return. | Order of Competitor in Relation to Number of Fruiting Canes. |
|--------------------|-------------------------------------------------|-------------------------------------|-------------------------------------------|-------------------------------------------------|--------------------------------------------------------------|
| 11                 | 1,007                                           | 496                                 | Lbs.<br>4,938                             | 1 } &                                           | 1                                                            |
| 14                 | 991                                             | 455                                 | 4,938                                     | 1 } 2                                           | 2                                                            |
| 16                 | 845                                             | 457                                 | 4,801                                     | 3                                               | 3                                                            |
| 18                 | 844                                             | 346                                 | 4,605                                     | 4                                               | 4                                                            |
| 15                 | 785                                             | 558                                 | 4,436                                     | 5                                               | 6                                                            |
| 13                 | 695                                             | 262                                 | 4,384                                     | 6                                               | 8                                                            |
| 12                 | 830                                             | 492                                 | 4,149                                     | 7                                               | 5                                                            |
| 17                 | 774                                             | 287                                 | 3,903                                     | 8                                               | 7                                                            |



The preceding table shows that the first four competitors secured crop returns in the same order as the number of fruiting canes left on the vines, but this did not apply to the competitors lower down on the list. It must, however, be realised that this method of finding the relationship between the number of fruiting canes and vine yields can be approximate only, as the fruiting rods, being of various lengths, cannot all be of the same value for fruiting purposes.

#### BUDS PER VINE.

It was, therefore, considered that the number of buds left on the fruiting canes would probably give a more accurate ratio to crop returns than that given by the number of fruiting rods only. Accordingly, after the pruning operations for the 1930 season had been completed, it was decided to count the number of fruiting buds left on the vines by the pruners. However, as it was realised that the counting of the buds on all of the vines would occupy more time than the judges were able to give to this work, the buds on six typically pruned vines only of each competitor were counted and averaged per vine, and the number so obtained was in each case used as the average number of buds per vine for each competitor.

The relation of the number of fruiting buds to the weight of fresh fruit is shown in the following table:—

1931 Crop—Relation of Number of Buds to Fruit Yields.

| No. of Competitor. | Appr. Average Buds per Vine. | Total Weight of Fresh Fruit, per 46 Vines, in Lbs. | Average Weight of Fresh Fruit per Bud in Lbs. | Order of Competitor in Relation to Fruit Yields. | Order of Competitor in Relation to Number of Buds. |
|--------------------|------------------------------|----------------------------------------------------|-----------------------------------------------|--------------------------------------------------|----------------------------------------------------|
| 14                 | 90                           | 856                                                | ·2067                                         | 1                                                | 1                                                  |
| 11                 | 81                           | 803                                                | ·2155                                         | 2                                                | 2                                                  |
| 16                 | 66                           | 782                                                | ·2576                                         | 3                                                | 3                                                  |
| 13                 | 64                           | 772                                                | ·2622                                         | 4                                                | 4                                                  |
| 18                 | 63                           | 723                                                | ·2494                                         | 5                                                | 5                                                  |
| 15                 | 58                           | 685                                                | ·2567                                         | 6                                                | 6                                                  |
| 17                 | 53                           | 668                                                | ·2739                                         | 7                                                | 8                                                  |
| 12                 | 54                           | 643                                                | ·2588                                         | 8                                                | 7                                                  |

The above figures show that in the case of the six highest competitors, these secured fruit yields in the same order as the number of fruiting buds left on the vines. However, the column relating to the average weight of fresh fruit produced per bud shows that the buds were not all of the same value for fruiting purposes, and this will explain why the two last competitors do not follow in the same order on the list as the others, as this is shown to be due to No. 17 selecting fruiting buds of slightly superior quality to those of No. 12. It will be observed that Competitor No. 14, who used the largest number of fruiting buds per vine, namely, 90, obtained the lowest weight of fresh fruit per bud. The results of the experiments for the three years seem to show that, generally speaking, the competitors who gave their vines the most to do obtained the best returns, which in a great measure is probably due to the nature of the vines, which on account of their vigor were able to respond to such treatment, whereas weaker vines may not have done so.

#### PRESENT CONDITION OF THE VINES.

On present indications the condition of the vines pruned by all of the competitors appears to be favorable for the production of a good crop for the coming season. On some of the vines pruned by the three leading competitors, however, there has been a tendency in some places for the fruiting wood to run rather far away from the crown of the vines, making it necessary in such cases for these vines to be shortened back more severely in the future.



## RECOMMENDATIONS OF JUDGES.

As the Competition has resulted in a tie, the judges would recommend, with the consent of Mr. Wilksch, that the pruning trials be extended for another three years, but that the prize of £2 2s. offered by the Berri Branch of the Agricultural Bureau should be equally divided between the two leading competitors, namely, Messrs. B. H. Jungfer and A. G. Jarvis. The judges would also point out as an encouragement to the other competitors that their vines, probably owing to having been pruned more severely, are at present in a somewhat better condition in regard to the position of their fruiting wood than those of the pruners who so far have obtained the largest crops. This should result in their securing good crops in the future, whereas the leading pruners, through having more severely taxed the strength of their vines in the past, may find it necessary, in trying to stimulate their vines to more vigorous growth, to prune these in a more drastic manner during the coming years, which may result for a time in a decline in their yield.

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**THE MARKETING OF CITRUS FRUITS.**

[By F. H. METTERS, Waikerie.]

In a paper submitted to a previous Bureau Conference I dealt with the care necessary by the producer and packer of citrus fruits to ensure the fruit reaching its destination in as near perfect condition as possible, and I now propose to treat with the actual disposal of the fruit on the market, and the means adopted by the several State Citrus Associations and the Federal Citrus Council of Australia in the regulation of the supply of oranges to the market and the stabilisation of prices.

History records that in the past the marketing of practically all primary products has been undertaken in a most haphazard and uncontrolled manner, and this applies to most sections of agricultural products at the present time, with the result that there are periods of heavy over-supplies on the markets at consequent unprofitable returns to producers. In 1921 citrus growers were faced with many serious problems on the markets in Adelaide and Melbourne, which brought into existence the present co-operative organisations.

The two principal factors governing the successful marketing of any product of the land are:—1, the control by the producers of their particular produce; and 2, the regulation of supplies to the market concerned. Because of the bearing these two features have on efficient marketing, I cannot too strongly stress the need for the close and loyal co-operation of the grower, failing which only chaos can result.

In framing the policy of the Citrus Associations, one of the first essentials was to ascertain the possible requirements of the market at a selling price profitable to the owner of the fruit. As a result, the quota system was introduced, whereby the amount of fruit forwarded is adjusted from time to time in accordance with market requirements, great care being taken to neither overload or under-supply a market.

A team of suitable agents, having a large turnover, and who were prepared to work in with our ideas of marketing, was selected, and it has been proved without doubt that with a limited number of agents more control could be obtained at the marketing end than by giving our business to the whole of the agents operating on the market, provided growers confined the selling of their fruit to the selected agents.

Subsequently the Federal Citrus Council of Australia, which operates for the joint State interests, appointed its own market manager in Melbourne, whose duties are to fix quotas, stabilise prices, inspect fruit, issue reports, inspect agents' books, authorise repacking and cool storage, pass account sales, and watch associated growers' interests generally. These interests are further fully protected in the matter of the rate of selling commission, guaranteed payments, and fire insurance.

The buyer on the market to-day is a very particular person, and carefully scrutinises every pack that comes before his notice, and it is only by close attention to the preparation of his pack that a grower can hope to realise top market value and ready sale.



Fruit that is not up to the buyer's idea of a standard is either passed by or sold at a discount. It should be seen to that all fruit is kept rigidly in its respective classification, Special, Standard, or Plain. For instance, one Plain orange noticed in a case of Standards will probably reduce the value of that case to that of the lower grade. The container should be packed sufficiently tight to ensure its arriving full. A partly filled case obviously will not realise full-case value; but the costs of packing and transport are identical. Although South Australian oranges have held pride of position on the Melbourne market for many years, other centres are fast overtaking us, and every attention should be given to the establishment of a first-class pack.

It is considered advisable to either print an indelible trade name on the rind of the fruit, or use an attractively printed wrapper, confining this to Specials or Standards; but this practice should be adopted only on fruit that will induce the consumer to repeat his order.

All fruit should be free of scale or sooty mould, otherwise it is likely to be condemned by Departmental inspectors. Dry or frosted fruits should under no circumstances be marketed; it is ruinous to the trade generally. An Act of Parliament operates in Victoria dealing with the maturity of oranges, and, although the means of testing for maturity are by no means perfect, the Act gives the inspectors power to prohibit the offering of fruit for sale that does not comply with the regulations.

In Victoria and New South Wales oranges must be placed into Special, Standard, or Plain grade, which are defined in the Act, and the case marked accordingly. This regulation is strictly enforced by the departments concerned.

To summarise, the following are the principal factors governing the buyers' attention:—

1. Continuity of supply.
2. Standardisation of grading for color and weight.
3. Evenness of sizing.
4. Degree of maturity.
5. Tightness of pack and a full case.
6. Elimination of off-type fruit and culls.
7. Correct classification under the headings, Special, Standard, or Plain.
8. An attractive case neatly stencilled or labelled.

Although in the past Australia has consumed its own production of Citrus Fruits, at prices remunerative to the producer, the time has arrived when we are faced with the necessity for export, and the Federal Citrus Council is inquiring into every possible avenue in this direction. The high costs of production in Australia and the depressed economic conditions the world over, and consequent low values, are no incentive for growers to send oranges overseas; but as the position has to be faced, fruit is this season being dispatched to England, Canada, and the East.

In the years 1921 to 1925 the Murray Citrus Growers' Co-operative Association, Limited, was quite successful in export, and the fruit was stated, by all who handled it overseas, to be at least equal to any other, marketed at that time. Since 1925 no export has been undertaken by that body, but this season 6,000 export cases of navel oranges, each of 1½ bush., are being shipped to England in July, and, as a decided improvement has taken place in both the quality and the packing of the fruit, exporters should expect to realise top market value.

One of the many difficulties encountered in connection with export is the reluctance of most shipping companies to accept oranges as freight, when commodities such as tea, flour, butter, eggs, &c., are carried, the orange being liable to taint such cargo. Pre-cooling of the fruit, however, tends to reduce this risk.

Valuable assistance is being given to marketing, both local and export, by the several Departments of Horticulture and the Council for Scientific and Industrial Research. Recently the latter body issued recommendations for the harvesting and packing of oranges for export, being the results of its investigations.



In conclusion, I desire once again to impress upon those interested in citrus marketing, either local or export, to associate themselves wholeheartedly with the co-operative movement in order that the fruit will sell to the best advantage, and at a minimum marketing cost. Never before has joint effort and control of supplies been more needed than at present. The actions of even a small number of growers operating independently invariably tends to reduce market values. If all citrus growers were confining the sale of their fruit to the accredited agents of the Citrus Associations, prices would be several shillings per case higher than those now obtaining.

## SUMMARY OF REPORT ON SULTANA DRYING EXPERIMENTS DURING THE 1931 SEASON.

*[Conducted conjointly by the Council for Scientific and Industrial Research with the Horticultural Branch of the Department of Agriculture of South Australia on vineyards situated at Berri and Renmark.]*

[By F. R. ARNDT, Horticultural Instructor.]

These experiments in Sultana drying were undertaken with the object of collecting data in regard to various systems used in the drying of Sultana grapes, and to ascertain how the quality of the fruit, when dried, was affected by the nature of the soil upon which it was grown, and by the climatic conditions operating during the drying period. The experiments were conducted at the vineyards of Messrs. Basey and Howie, of Renmark, and of Mr. J. Partridge, of Berri.

The Council for Scientific and Industrial Research was represented at the experiments by Mr. A. C. Ingerson, of Berri, acting under instructions from Mr. A. V. Lyon, M.Sc., of Merbein, who collaborated with myself in carrying out the work.

The different dipping systems experimented with were as follows:—

The Cold Carbonate of Potash Dip.

The Standard Hot Mixed Dip.

The Ingerson Dip.

The Modified Hot Caustic Soda Dip.

Two series of experiments with the above-mentioned dips were conducted at each of the vineyards previously referred to.

### FIRST SERIES OF EXPERIMENTS.

The first series of experiments were conducted at Berri and Renmark between February 17th and March 9th, under good weather conditions, the highest maximum temperature being 101.6° Fahr., and the lowest maximum 69° Fahr. No rain fell during the drying period.

The fruit treated was of good quality at both vineyards, the Renmark fruit, which registered 12° Baume, being a little sweeter and of a more golden color than the Berri fruit, which showed a sugar test of 11½° Baume, and was greener in color.

The soil upon which the fruit was grown was in both cases a firm clay loam, of which the Renmark soil was slightly the firmer of the two.

### STRENGTH AND TEMPERATURE OF DIPPING SOLUTIONS.

The strength and temperatures of the dipping solutions used were as follows:—

*Cold Potash Dip.*—Strength, at rate of 25lbs. carbonate of potash and 1½ pints of olive oil to 50galls. of water. This formula was used at both vineyards.

*Standard Mixed Dip.*—At Berri—Strength, 2½lbs. carbonate of potash, 2lbs. caustic soda, and 1½ pints of olive oil to 50 galls. of water. Temperature, 178° to 181° Fahr. At Renmark—Same temperature and strength as at Berri, with the exception of a reduction of ½lb. of caustic soda.



*Ingerson Dip.*—At Berri—Strength, 2½lbs. carbonate of potash, 1½lbs. caustic soda, and 2ozs. of olive oil to 50galls. of water. Temperature, 187° to 190° Fahr. At Renmark—Same temperature and strength as at Berri, with the exception of about 3ozs. increase in caustic soda content.

*Modified Hot Caustic Soda Dip.*—Strength—1½lbs. caustic soda to 50galls. of water. Temperature, 190° to 193° Fahr. This formula was used at both places.

#### THE TIME OF DRYING.

*At Berri.*—The time of drying from dipping to the placing of the fruit into sweat-boxes was as follows:—*Modified Hot, Standard Mixed Dip, and Ingerson Dip*=16 days. *Cold Potash Dip*=21 days.

*At Renmark.*—Time on rack—*Mixed Dip, Ingerson Dip, and Modified Hot Dip*=13 days. *Cold Potash Dip*=16 days.

Time from spreading on to rack until placing into sweat-boxes—*Standard Mixed Dip, Ingerson Dip, and Modified Hot Dip*=16 days. *Cold Potash Dip*=20 days.

The fruit treated by the Cold Potash Dip was in both instances sprayed with the Standard Cold Potash Solution three times while on the rack, and was washed after its removal from the rack.

The fruit treated with the Modified Hot Caustic Soda Solution was sprayed (with the exception of that situated on half of the top tier) with the Standard Cold Potash solution within 48 hours after spreading on the rack. The effect of such spraying was a very slight brightening up of the color of the dried fruit, but did not shorten the drying period as compared with the fruit that had not been sprayed.

#### QUALITY OF DRIED FRUIT.

*At Berri.*—The quality of the dried fruit was excellent, and the color, from light golden to more amber shades, occurred in the following order:—1. Cold Potash Dip. 2. Standard Mixed Dip. 3. Ingerson Dip. 4. Modified Hot Caustic Dip.

*At Renmark.*—The dried fruit was of a darker shade than that obtained at Berri. This may be chiefly accounted for by the more amber colored nature of the fresh fruit, and by the fruit not being shaded as much as in the Berri experiments. An interesting fact to note in this connection is that the fruit treated by the Cold Potash and Standard Mixed Dip formulas, which contain the largest amount of olive oil, was not browned as much by the direct rays of the sun as that treated by the other solutions containing less oil, showing the protection against sunburn accorded to fruit that has been well coated with olive oil.

The shades of color produced in the dried fruit by the different dipping solutions was from golden to darker shades in the following order:—

1. Cold Potash Dip. 2. Standard Mixed Dip. 3. Ingerson Dip. 4. Modified Hot Caustic Dip, thus coinciding in each instance with those of the Berri trials.

#### SECOND SERIES OF EXPERIMENTS.

The second series of experiments were conducted under less favorable weather conditions than those of the first series. The fruit was dipped at Berri on March 4th and at Renmark on March 5th. The highest maximum temperature during the drying period was 98° Fahr. and the lowest maximum 62° Fahr. Rain fell on March 13th, 52 points; March 19th, 5 points; March 20th, 5 points; March 21st, 7 points; March 22nd, 5 points; and April 1st, 30 points.

#### QUALITY OF FRESH FRUIT.

*At Berri.*—The fruit was of good quality, being from slightly greenish-yellow to bright golden in color. The sugar content was 13° Baume. *At Renmark.*—The quality of the fresh fruit was only fair, much of it being over-ripe, and there was a large number of dark, burnt berries on the bunches. The sugar content of the fruit registered 14° Baume.



The nature of the soil upon which the fruit was grown was, at Berri, a firm red loam with a moderate amount of sand in its composition, and at Renmark this consisted of a stiff red loam.

#### STRENGTH AND TEMPERATURE OF DIPPING SOLUTIONS.

These were in some instances varied from those used at the first series of trials, owing chiefly to the altered condition of the fruit, and consisted mainly of additions of caustic soda, in order to crack the berries sufficiently.

*The Cold Potash Dip.*—This was used at the Standard Potash strength of 25lbs. to 50galls. of water, but the olive oil content was raised from 1½ pints of olive oil to 2½ pints of that used at the first series of trials.

*The Standard Mixed Dip.*—Strength—2½lbs. carbonate of potash, 2½lbs. caustic soda, and 1½ pints olive oil to 50galls. of water. This strength was used at both Berri and Renmark, and is an increase in caustic soda of ½lb. to 50galls. *Temperature*—Berri, 177° to 181° Fahr. Renmark, 178° to 181° Fahr.

*Ingerson Dip.*—Strength, 2½lbs. carbonate of potash, 2½lbs. caustic soda, and 2ozs. olive oil to 50galls. of water was used at both places. *Temperature*, Berri, 184° to 188° Fahr.; Renmark, 183° to 186° Fahr.

*Modified Hot Caustic Soda Dip.*—Strength—At Berri, 2lbs. caustic soda to 50galls. water. *Temperature*—188° to 193° Fahr. At Renmark, 2½lbs. caustic soda to 50galls. *Temperature*—188° to 193°.

#### TIME OF DRYING.

*At Berri.*—Time on rack—Standard Mixed Dip, Ingerson Dip, and Modified Hot Dip = 17 days. Cold Potash Dip = 20 days.

Time from spreading on to rack to placing into sweat-boxes.—Standard Mixed Dip, Ingerson Dip, and Modified Hot Caustic Dip = 20 days. Cold Potash Dip = 24 days.

*At Renmark.*—Time on rack—Standard Mixed Dip, Ingerson Dip, and Modified Hot Dip = 21 days. Cold Potash Dip = 24 days.

Time from spreading on to rack until placing into sweat-boxes.—Standard Mixed, Ingerson, and Modified Hot Dip = 22 days. Cold Potash Dip = 29 days.

#### QUALITY OF DRIED FRUIT.

*At Berri.*—The dried fruit was of first class quality for all kinds of dips used, and the color, from light golden to slightly darker shades, varied in the following order:—  
1. Cold Potash Dip. 2. Standard Mixed Dip. 3. Ingerson Dip. 4. Modified Hot Dip—thus coinciding with the order obtained at the First Berri and First Renmark Series.

*At Renmark.*—The quality of the dried fruit produced was inferior to that produced at the other three series of drying trials, the fruit treated by the Cold Potash Dip especially darkening in color during damp weather, although it was not wetted by rain falling upon it. The fruit treated by the Ingerson Dip appeared to be the least affected by the adverse weather conditions. The color of the fruit, from light to dark, according to the different dipping processes, varied in the following order:—1. Ingerson Dip. 2. Standard Mixed Dip. 3. Modified Hot Dip. 4. Cold Potash Dip—thereby differing greatly from that obtained at the previous trials.

#### SUMMARY OF RESULTS.

The chief results obtained at these experiments in Sultana drying—as far as the conditions operating during the past season seem to indicate—are briefly as follows:—

1. That the Cold Potash Dip produces the finest colored sample of dried fruit, provided that the fresh fruit used is of first class quality and that weather conditions are hot and dry. However, with inferior fruit and unfavorable weather conditions the results obtained from the use of this dip are disappointing. Also, the drying period of fruit processed by this dip is from four to seven days longer than that treated by the other dipping systems under similar weather conditions.



2. That the Standard Mixed Dip and the Ingerson Dip (also a mixed dip) have consistently produced a lighter colored sample of dried fruit than that resulting from the use of the Modified Hot Caustic Soda Dip, while the drying period of the fruit is the same in both cases.

3. That trials with a dipping process between that of the Standard Mixed Dip and Ingerson Dip would probably give interesting results, as it is probable that the use of 1½ pints of olive oil to 50galls. of solution is excessive in the former dip, while the use of 2ozs. of olive oil in the latter dip is often insufficient to protect the fruit from sunburn, unless it is well shaded while on the racks.

I would therefore suggest that for next season a dipping system be tried, containing the following ingredients:—

2½lbs. Carbonate of Potash.

1½lbs. to 2lbs. Caustic Soda.

½ pint of olive oil to 50galls. of water, at a temperature of 180° to 185° Fahr.

4. Regarding the suitability of the dips used to the fruit produced on different classes of soil, no definite conclusion can be drawn from one year's trials, and further experiments are necessary to obtain fuller data upon this subject.

Mr. A. V. Lyon M.Sc. (Merbein Research Station) read a paper, "Water Penetration."

An address, "Management and Care of Poultry" was delivered by Mr. C. F. Anderson (Poultry Expert).

Conference decided that the 1932 gathering should be held at Waikerie.

At the evening session, Professor J. A. Prescott (Waite Agricultural Research Institute) delivered an address, "The Soils and Soil Problems of the River Murray Irrigation Areas."

## Metropolitan Abattoirs, Adelaide.

MANUFACTURERS OF

## Meat Meal for Pigs.

Read Report of trials made by PROF. PERKINS, *Journal of Agriculture*,  
January and July, 1921.

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## TREATMENT AND CONTROL OF WORM INFESTATION OF SHEEP.

[Extracts from an article on "The Control of Stomach Worms of Sheep" by Dr. Gunies Ross, *Journal of the Council of Scientific and Industrial Research*, May, 1929, with remarks [in brackets] by Officers of the Stock and Brands Department].

Control of worm infestation may be brought about by:—

- (1) Attacking the worms in the sheep by medicinal treatment.
- (2) Attacking the worms on the pastures by such measures as burning off and the systematic use of paddocks in such a way as to reduce the chances of sheep obtaining heavy infections.

### MEDICINAL TREATMENT.

In administering medicinal treatment to sheep, the object is not only to cure them of worm infestation, but, more important still, the object is to kill all the worms in them, so that they can no longer produce eggs to further contaminate the pastures.

In practice, however, it is not possible to kill every worm, as there is no medicament known which can be guaranteed to do so, and also, in many instances, it is impossible to administer the medicament sufficiently often, but it is still possible to reduce losses from worms to a minimum and to convert what is unsound country into a payable proposition for sheep.

There are a number of drugs employed for the treatment of worms in sheep, the best of which at the present time is carbon tetrachloride. Less effective is copper sulphate (bluestone).

#### 1. *Treatment with Carbon Tetrachloride.*

**Dose.**—Lambs, 1 cubic centimetre or 17 drops; adult sheep, 2 cubic centimetres or 34 drops.

Owing to the small size of the dose, it may be conveniently administered either in gelatine capsules containing 1 C.C. or 2 C.C., or mixed with four parts of medicinal liquid paraffin, in which case the dose would be 5 C.C. (cubic centimeters) for lambs and 10 C.C. for adult sheep.

[One gallon of the mixture is sufficient to dose approximately 800 lambs or 400 adult sheep, and at a cost of 18s. per gallon the cost is approximately ½d. per lamb and ½d. per adult sheep per dose.

The advantages of this treatment over copper sulphate are:—

- (1) Smaller dose administered by a syringe.
- (2) Quicker to administer.
- (3) After administering, sheep can be allowed out to graze immediately.
- (4) Is effective also against liver fluke.]

**Before Treatment.**—The sheep are yarded overnight and dosed the following morning before being allowed food or water.

**Administration.**—If capsules are employed, they are best given by means of a small balling gun, which can be made by taking a piece of stiff rubber tubing about 9in. long and with an internal diameter of ½in. A plunger of cane or wood should be fitted so that it runs easily and smoothly in the barrel and sufficiently long to form a handle.

In order to avoid the danger of injury to the sheep's throat, a guard should be placed on the handle so that when the plunger is driven home, the end is not less than ½in. from the end of tubing, and the plunger should be rounded and smooth so that it will not break the capsule which is placed in the end of the tube.



The operator stands in front of the head, the catcher opens the mouth by grasping both upper and lower jaws, and the barrel is inserted and pushed back over the base of tongue, but not hard against the back of throat.

The plunger is then driven home smartly, but not too vigorously, and the gun immediately withdrawn as the jaws are released simultaneously. Capsules are administered in this way easily, but by other methods, such as using forceps, it is often uncertain and tedious.

When the liquid is used, it should be given by an all-metal syringe with a long, curved nozzle, holding exactly 5 or 10 C.C., according to dose required.

Syringes can be purchased which hold 10 C.C. with a thumbscrew on the handle of piston which can be regulated to control the dose if only 5 C.C. is required.

The syringe is filled with the liquid, the nozzle inserted over the sheep's tongue, and the syringe steadily emptied.

[*Precaution.*—Owing to carbon tetrachloride evaporating rapidly, the mixture should be well agitated at frequent intervals in the original container and only a small quantity poured into the vessel from which the syringe is filled.]

Of the two methods the liquid mixture is recommended as being cheaper and more convenient and easier to administer, but is sometimes not so effective as the capsules, owing to insufficient care being paid to keeping the mixture well shaken and losing carbon tetrachloride by evaporation, so that in some cases sheep may receive practically nothing but liquid paraffin.

On the other hand, the capsules, while much more expensive and less convenient to administer, contain a dose which is accurately measured, and no loss by evaporation can take place, so that every sheep receives the correct dose.

## PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1931—

### Eggs for Hatching and Day old Chickens

#### WHITE LEGHORNS.

EGGS.—10/- per setting of 15 Eggs. Incubator lots £2 per 100.

DAY OLD CHICKENS.—15/- per dozen. £5 per 100.

#### BLACK MINORCAS.

EGGS.—12/6 per setting of 15 Eggs. Incubator lots £2 10s. per 100.

DAY OLD CHICKENS.—17/6 per dozen, £6 per 100.

Free on Rail, Salisbury. DELIVERY, July, August, and September.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Victoria Square, Adelaide.

G. F. ANDERSON, Poultry Expert.



Precautions to be observed when dosing with carbon tetrachloride:—

- (1) In certain rare instances, carbon tetrachloride, though absolutely safe for normal sheep, in doses five to 10 times the size of that recommended may cause some mortality.

The cause of this mortality has never been satisfactorily explained in all cases, but one factor known to influence the toxicity of the drug is the presence of mineral deficiency in the pasture, lack of calcium being of paramount importance.

When sheep are running on calcium-deficient country they should be given a lick rich in calcium, that is a lick containing superphosphate, calcium phosphate, or bonemeal for one week prior to dosing.

- (2) Another precaution is to try the effect of the drench (when being used for the first time or after a long period has elapsed since the last treatment) on a small percentage of the sheep of different classes (i.e., lambs, ewes, wethers). If no ill effects follow this trial drenching, it should be perfectly safe to proceed with general drenching.
- (3) During the actual administration of the drug, the sheep should be held in standing position and the head not forced too far back or upwards, especially when the liquid is used, and the tongue and the lower jaw should be left free.

[In the case of capsules, do not hold the jaws shut after administration in case the sheep did not swallow it, because if the capsule should be retained in the mouth and be broken, it may cause the animal to suffocate owing to evaporation of the carbon tetrachloride and absorption by lungs.]

- (4) It is very necessary to obtain the drug from reliable firms, as an impure preparation may be both dangerous and ineffective.

[In South Australia reports have been received by the Stock and Brands Department of some untoward results following the administration of carbon tetrachloride.

In one case, by mistake, sheep were given 5 C.C. of the drug as a drench without any oil, and before the mistake was found out two or three died.

In another case, a number of lambs were given 10 C.C. of the mixture and developed swellings around the head for a couple of days, but otherwise no ill effects noted.]

## 2. Treatment with Copper Sulphate Solution.

Bluestone (copper sulphate) is administered in the form of a 2 per cent. solution of the drug in water, and is prepared as follows:—

Dissolve 8ozs. of bluestone in 3galls. of water, and of this give the following doses:—

|                                  | Fluid ozs. |
|----------------------------------|------------|
| Adult sheep . . . . .            | 2          |
| Two toothed . . . . .            | 1½         |
| Lambs, 6-12 months old . . . . . | 1          |
| Lambs, 3-6 months old . . . . .  | ½          |

In preparing the solution, use only hard, blue crystals of the drug, discarding all lumps that are white and powdery. Break up the lumps and dissolve in a little boiling water; then add cold water to make up 3galls. of solution in an enamel bucket.

Iron utensils should not be used owing to the corrosive action of the solution.

[Administer, using the same precautions as recommended for the carbon tetrachloride liquid. Three gallons of a 2 per cent. solution will be sufficient to drench approximately 230 adult sheep. (Three gallons is equivalent to 480 fluid ounces).

Until recently a 1 per cent. cent. solution was recommended by the Stock and Brands Department.]



## TOBACCO CULTURE.

[By B. C. SCOTT, Supervisor of Experimental Work, and S. B. OPIE, Field Officer.]

(Continued from page 1165, *Journal of Agriculture*, June 15th, 1931.)

### BULKING.

After removal from the barn the leaf is bulked down, that is to say, is stacked, during which time it should pass through a mild ferment and improve in quality. It is necessary that it should be in the proper condition as regards moisture, otherwise trouble will be experienced. If the leaf is too dry it will be easily damaged, whilst if too wet, mould will quickly appear. Therefore, the leaf must be sufficiently pliable that it will open after being squeezed in the hand, and at the same time not so moist that the midrib cannot be easily snapped at about two-thirds of the way up the blade.

Bulks are made by placing the tobacco in stacks each two rows of leaves wide with the blades overlapping a few inches in the centre, and the butts outwards. The heaps should be as high as possible, and as long as convenient, as large stacks make for better leaf than smaller ones.

The tobacco may be bulked when still on the sticks, or, on the other hand, the leaves may be taken off. If sufficient sticks are available, the former method allows for easy and rapid handling. As the leaf readily absorbs moisture, the bulk should be kept some inches above the floor, thus allowing for free circulation of air. The usual procedure is to build on logs or low benches. On completion the stack should be covered with hessian, old bags, or rugs, &c., and lightly weighted down. The heap must be carefully examined every few days to see that it does not become over-heated. This may be ascertained by inserting the hand well into the leaves and noting the temperature, but a better plan is to place a thermometer in the centre of the stack, and if the reading should exceed 80° F. it will be necessary to pull down the bulk and rebuild. When rebuilding, the leaf which was originally placed in the centre of the bulk should be stacked in the outer layers. However, if bulked in the right condition the tobacco will not require turning, and after passing through this mild sweat, may be left untouched for some months, during which time it will improve in quality. On the other hand, if put down with too much moisture it may be necessary to rebulk two or three times, whilst the burning of fires in the bulking room to dry the atmosphere may prove advisable. Should mildew occur, due to fatty stems, the leaf may have to be returned to the curing barn for further drying out.

### GRADING.

The whole of the leaf secured from a tobacco crop is not of uniform quality, and, in order to demand the best prices, it must be graded into classes according to color, texture, size, and soundness. In this connection emphasis must be placed on the necessity for careful grading if maximum values are to be expected, and any doubtful leaves must always be placed in the lower class.

The colors must be kept as uniform as possible, and for this work a well lighted room is essential.

Before grading can be commenced the atmospheric conditions must be such that the leaf has been rendered pliable, and will permit of handling without damage.



## KEY TO COLORED PLATES.

### A.—Appearance of the Leaf at the Commencement of the Operation of Fixing the Color.

In the curing process the leaf is held in a humid atmosphere, and the dry bulb thermometer registering not more than 100° F. until the yellowish shade is pronounced. This is the critical stage in curing; as should the next stage be commenced before sufficient color has been promoted, the green matter becomes fixed in the cured leaf, and its value greatly reduced. On the other hand, if the leaf is allowed to become too yellow it may not hold the desired color throughout the remaining stages, and becomes dark in shade before drying is complete (see page 1165).

### B.—Lemon Yellow Leaf.

This type of leaf commands the highest prices, provided that it is also of good body, silky texture, tough, elastic, oily, of large size, with no holes or spots.

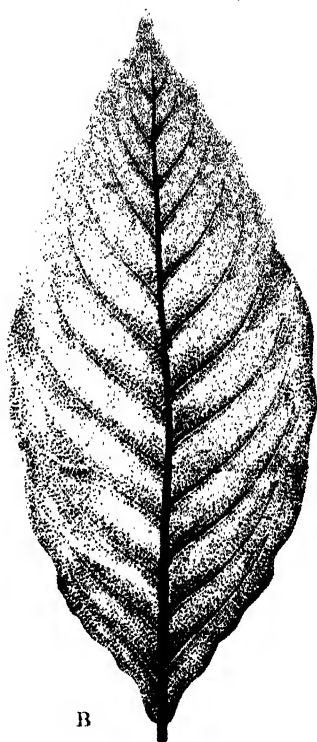
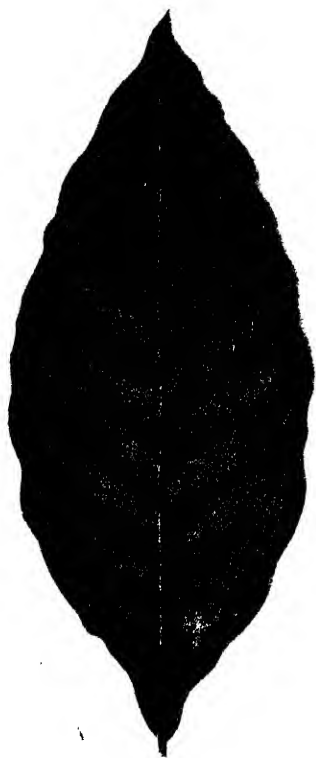
### C.—Bright Mahogany Leaf.

This is a very good class of leaf, and is only slightly less valuable than the lemon yellow type, provided that it possesses good texture, &c. It is found in fairly high percentages in the produce from the best growers in this State,

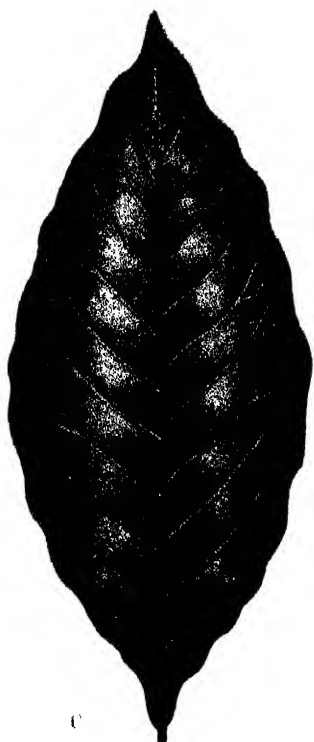
### D.—Dark Mahogany Leaf.

Third class leaf as regards color, but commanding good prices when light bodied and of fine-grained texture. This type is produced from rather heavy leaf carrying a fair amount of moisture, such as would be the case when grown on loam soils or when harvested late in the season.

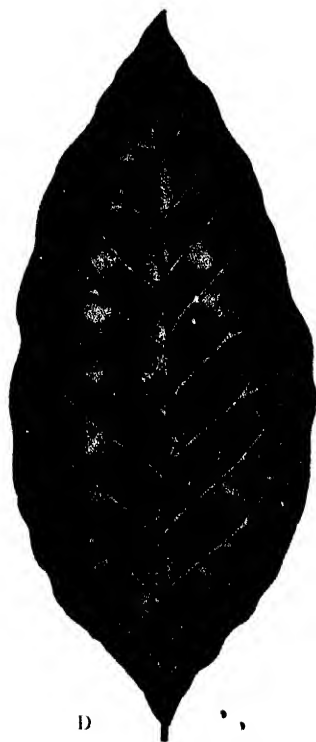




B



C



D







The various classes into which tobacco may be divided are as follows:—

*Colors.*

|                           |                                                            |
|---------------------------|------------------------------------------------------------|
| Lemon yellow . . . . .    | Bright to pale-yellow color.                               |
| Bright mahogany . . . . . | Darker than yellow, ranging between bright orange and red. |
| Dark mahogany . . . . .   | Ranging between orange and dark red.                       |
| Dark . . . . .            | Consists of all darker colored leaf.                       |

*Texture.*

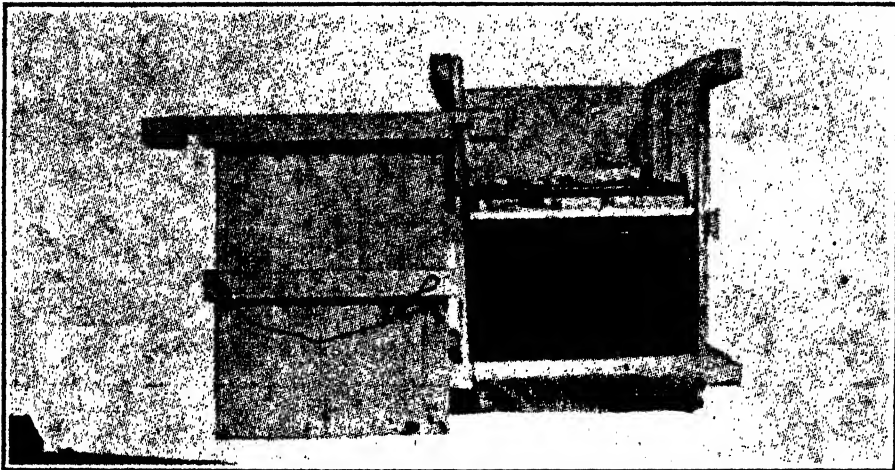
|                          |                                                                                            |
|--------------------------|--------------------------------------------------------------------------------------------|
| First quality . . . . .  | Light bodied, thin, elastic, silky leaves.                                                 |
| Second quality . . . . . | Leaves from the bottom portion of the plant with light body, but not so silky and elastic. |
| Third quality . . . . .  | Leaves of medium to heavy body.                                                            |

*Size.*

|                 |                        |
|-----------------|------------------------|
| No. 1 . . . . . | Large, sound leaf.     |
| No. 2 . . . . . | Small or damaged leaf. |

Included in the dark leaf would be the coarse, dark tobacco, whilst very poor class and green leaf would be kept quite apart from other grades.

It is not suggested that all these classes should be made up, and the number will depend upon the quantity of leaf available. The smaller growers will probably ignore



A pressed bale kept under pressure by two iron bars until tobacco is properly set.

(From Rhodesia Agric. Journal).

the texture grades, and class according to color and size of leaves. In any case it is not advisable to make less than half a bale of any grade, and preferably regard one bale as a minimum for each class.

**HANDING.**

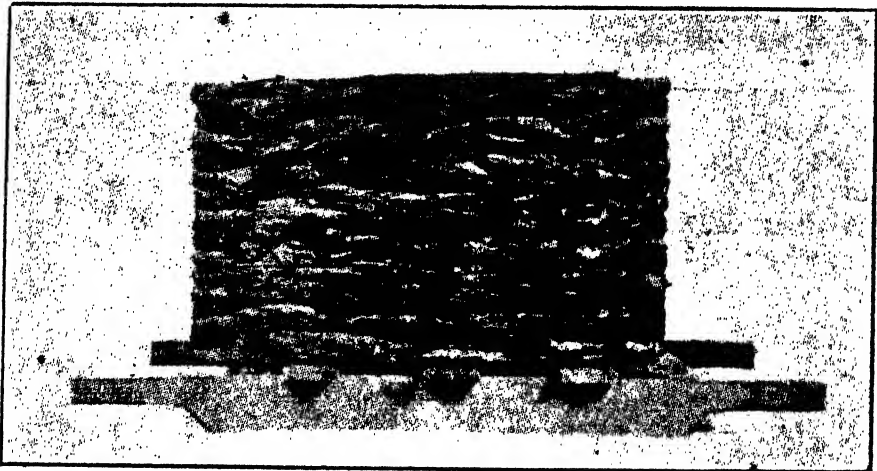
After grading the leaf is made up into bundles of about 15 to 20 leaves, called "hands." In "handing" the butts are all placed together and another leaf of similar quality bound neatly round them, making a tie of about 2ins. in width. To commence wrapping, the tip of the binding leaf is inserted between the stems and the tie completed by slipping the end through the "hand." This makes a neat and convenient bundle which rarely comes untied.

**BALING.**

For presentation to the buyer, and later for consignment to the factory, tobacco must be baled. This operation should be carried out as soon as convenient after grading, in order that no further changes in color should take place, but it is important to see that the leaf is not too moist at baling time, and is stored in a dry place.\* A press is



necessary, but is not difficult to make, and simply consists of a bottomless box with a movable side, and a lid which fits easily inside the top. In principle it is exactly the same as a wool press. The inside dimensions are about 3ft. long, 1½ft. wide, and 3ft. high, and will press a bale of the same length and breadth, but about 2ft. in height. A bale of this size will contain about 200lbs. of tobacco. A sheet of hessian is first placed on the floor under the press, and the hands of leaf neatly packed into the box with the butts towards the outside, and tips in the centre. The corners are bound by crossing the previous layer. The press is filled to the top of the box, when the lid is placed in position with a cap of hessian beneath, and sufficient pressure applied by screws, or levers, to make a fairly firm bale of about 2ft. in height. As heavy pressure tends to discolor the leaf, it must not be too tight. The sides are then removed, and the hessian which had been placed on the floor sewn to that inserted under the lid. The ends of the bale are covered, the pressure released, and the wooden lid removed. The next step is to mark with the grower's brand or initials, the grade of leaf, and the number of the bale.



Side View after being pressed. The method of placing layers in bale is illustrated.

(From Rhodesia Agric. Journal).

#### MARKETING.

Quality leaf is readily saleable, but inferior tobacco, such as heavy, dark, green, or immature leaf, is always liable to be rejected.

In this State it has been the practice for the buyer to visit the property of each grower and submit a price for the various grades presented. Should the producer be dissatisfied with the values offered, he has either to await the visit of the next buyer or forward samples to manufacturers, who have no representative visiting South Australia. In the past we have produced comparatively little tobacco, and only the buyer for the British-Australasian Tobacco Co. has visited growers. However, with the increased production it is probable that in future years the representatives of other firms will endeavor to purchase local leaf on the farm of the producer.

Upon acceptance of the purchase price, the leaf is railed to Melbourne before the final payment is made.

Whilst discussing the question of marketing, we desire to pay tribute to the British-Australasian Tobacco Co. for the assistance they have so willingly rendered to the tobacco-growing industry in this State.



## YIELDS AND PRICES.

The actual yield of tobacco is no criterion of the value of the crop, as heavy, coarse textured tobacco producing high yields per acre will have low poundage value, and, in fact, may prove unsaleable.

The type aimed at in this State is fine textured, mild smoking cigarette or tight plug tobacco, and a high yield for such type is about 8cwts. of cured leaf per acre. The average yield secured in South Australia at present is probably not more than 4cwts., increasing to 6cwts. or 7cwts. per acre in the case of the more experienced growers. With irrigation and added experience our average yield will probably be very considerably increased in future years, and maximum returns of up to half a ton per acre will no doubt be harvested. However, if the acre yield exceeds this figure, a fairly high percentage of heavy textured tobacco is sure to be included in the crop, and such quality will command a lesser value per pound.

The prices secured have not been particularly high, as compared with those obtained in other districts in the Commonwealth, due, no doubt, to the lack of humid climatic conditions in South Australia. They have ranged from 3s. 2d. per lb. to as low as 6d. per lb., whilst some leaf has been rejected. The average return is approximately 2s. per lb., whilst the better growers and curers have received up to as much as 2s. 4d. per lb. for the whole of their crop.

The returns from tobacco are, therefore, very high, but emphasis must be placed on the fact that experience plays a very important part in determining the amount of revenue received by the grower. New tobacco producers will probably have to buy their experience, and, therefore, would be well advised to limit the area planted in the first year or so, until they have gained a sound knowledge of the requirements of the crop for the production of quality leaf.

## PESTS AND DISEASES.

Quite a number of pests attack tobacco, and, if not kept under control, will frequently cause very considerable damage. On the other hand, whilst diseases are not so numerous, that known as blue mould has a most injurious effect upon the tobacco industry of Australia.

## PESTS.

Lucerne Flea (*Smynturus viridis*).—At times this pest causes much damage in the seedbed. It is very small, and, therefore, is liable to escape observation, whilst at the same time it may be destroying many of the tiny germinating seedlings.

Treatment consists of dusting with a 2 per cent. nicotine dust, which is procurable from most merchants. As the eggs of the flea may hatch out in a few days, the dusting must be repeated at least every fortnight.

Cut Worms (*Euxoa radians*).—These are caterpillars about 1½ in. in length, which attack plants at night, but during the day bury themselves in the loose earth surrounding the stem. They may do damage in the seedbed, but more frequently are destructive after the transplants have been set out in the field. The stem of the young seedling is severed, thus destroying it, and necessitating replanting.

Treatment should commence a few days before transplanting is anticipated, and consists of distributing poison baits over the field intended for planting. The bait is made up of 50lbs. bran and 1lb. Paris green moistened to a crumbly mass by the addition of sweetened water. The sweet solution may consist of 1lb. of sugar or 1½ pints of molasses dissolved in 1gall. of water. The mixture should be broadcasted over the field at the rate of about 20lbs. (dry weight) per acre, such distributing being done late in the evening, so that the bait may be fresh when the cut worms are active.

Should the field be badly infested, a small ring of poisoned bait may be strewn around each seedling, whilst before a plant is reset the soil should be searched for the destroying



cut worms. They are usually to be found an inch or so below the surface of the soil, and when disturbed assume a curled position. Turkeys or other poultry are useful in checking cut worms, and if turned into infested fields devour many caterpillars.

**Bud Worm (*Heliothis obsoleta*).—**This caterpillar is also known as the bollworm, and, in addition to tobacco, attacks many other types of plants. The moth lays her eggs in the heart of the plant, where they hatch out in the course of a few days. The caterpillars are about 1½ in. long when full grown, and vary in color from pale to dark green with striped bodies. They are very heavy feeders, and quickly eat out the tender portions of the plant, ruining many leaves.



Injury caused by Bud worm.

(U.S.A. Dept. of Agriculture.)

Treatment consists of poisoning and hand picking. The usual poisons are arsenate of lead or Paris green, broken down to a 10 per cent. dust with hydrated lime. This dust is applied to the whole of the plant, paying particular attention to treatment of the bud. A quick method of application is to place the dust in a coarsely woven bag or finely perforated tin, and to shake over each plant.

Hand picking is a tedious job, but is at times necessary.

**Leaf Miner (*Phthorimaea operculella*).—**The parent moth deposits her eggs within the tissue of the leaf or stem, and upon hatching the young caterpillar eats between the two sides of the leaf, leaving the skin intact. As a number may mine on a single leaf, they sometimes do considerable damage. The miner is about ½ in. long, with brownish head and greenish body. Owing to its method of entry, treatment is very difficult, but dusting as for bud worm appears to be of assistance.

**Stem Borer (*Phthorimaea heliopa*).—**This pest is of the same family as the leaf miner, which it resembles in appearance, but instead of working in the leaves, is situated in the stem. The eggs are frequently laid whilst the plants are still in the seedbed, and the caterpillar eats its way into the stem, thus severely checking the growth of the seedling. The stem swells, and within the swelling the caterpillar may be found.

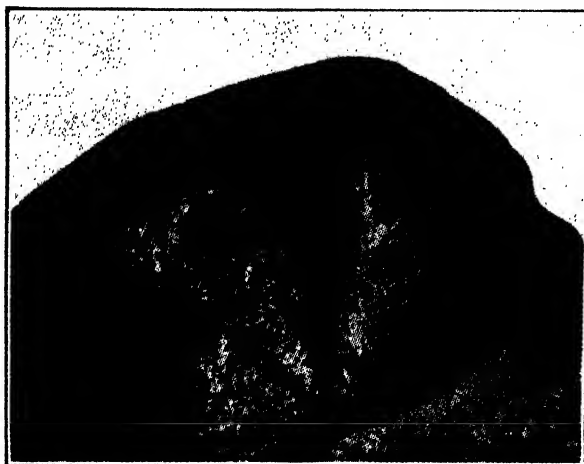
Treatment is not very effective, and consists of pruning the plant below where the borer is placed, and allowing only one shoot to develop.



## DISEASES.

A source of infection for disease may be the seed, and, therefore, all seed sown should have come from healthy plants and disease-free areas. Should any doubt exist, the seed may be pickled by immersing in a 10 per cent. Formalin solution for 15 minutes. Upon removal the seed must be washed in at least three changes of clean water, and thoroughly dried. The operation should take place shortly before seeding, as after about two months the germination is unreliable.

**Blue Mould (*Peronospora* sp.).**—This is the most serious disease affecting the tobacco crop in the Commonwealth, but, fortunately, has not been extensively reported in South Australia. There appears to be a definite relationship between the nature of the weather and severity of the blue mould attack. Bleak, wet periods, with cold nights and muggy days are conducive to the development and rapid spread of the disease. In Victoria



The underside of a young leaf infected with blue mould.

(N.S.W. Dept. of Agriculture.)

it is reported that seasons in which red rust is bad in the wheat crop are generally bad years for blue mould of tobacco. The first serious outbreak of blue mould in South Australia occurred in 1930, when rusty wheat crops were to be found in many districts. Blue mould particularly attacks seedlings in the nursery, and if weather favorable to the disease is experienced it will spread over the whole of the seedbed in the course of a few days. It makes its appearance in small circular spots on the underside of the leaf, and close examination shows these patches to be covered with a pale-bluish down consisting of the threads and spores of the disease. The spots rapidly increase in size if suitable conditions exist, and the plant dies in a few days. Sometimes plants will apparently recover, but if one is examined it will be found that under the bark the stem is encircled by a ring of black tissue. This ring is situated just above the ground level, and appears to be a bacterial disease associated with blue mould. If plants so affected are set out in the field they may completely recover, but are more likely to wilt off after making a certain amount of growth, or be broken off by comparatively gentle winds. On the other hand, if the plants in the seedbed make renewed growth, and examination, by cutting the stem of a few, shows the black ring to be absent or of faint color, the seedlings may be safely transplanted in the field.



**Treatment.**—No effective treatment has as yet been discovered, but the disease is being investigated by the Council for Scientific and Industrial Research, and the result of their work is awaited with interest by all connected with the tobacco-growing industry. At present treatment must be largely preventative, and aim at improving seedbed conditions, thus allowing plants to escape and also to resist attack. It is known that uniformly warm temperatures are not favorable to the development of the disease, and, therefore, heated seedbeds are sometimes constructed with flue pipes from a furnace at one end, led through the soil at a depth of about a foot from the surface.

Other measures are:—

1. Make provision for several seedings at intervals of a few weeks, in the hope that at least one seeding may escape the critical period.
2. Sterilise and adequately prepare the seedbed to promote the rapid growth of the young plants.
3. Cover and board the beds to protect them from excessive rain and cold.



A young tobacco plant infected with blue mould.

(N.S.W. Dept. of Agriculture).

4. Pay close attention to full ventilation, allowing the young plants plenty of air and sunlight.
5. Water sparingly.

As soon as the seedlings are ready for planting they should be set out in the field without delay, as transplants are rarely seriously attacked unless infested with the disease before removal from the nursery. Should the disease appear in the seedbed, all affected plants must be removed and destroyed whilst the mould may possibly be checked by spraying the remainder with Bordeaux mixture made up of 3lbs. copper sulphate, 2lbs. freshly burnt lime, and 50galls. of water, but success in this connection is by no means assured.

#### SUMMARY.

1. There is ample room for expansion in the tobacco-growing industry, as Australia only produces from 8 to 10 per cent. of its requirements for tobacco.
2. Only light textured, mild smoking, flue-cured leaf is saleable.
3. The production of bright tobacco was first commenced in South Australia in 1920, and appears likely to become an important and profitable crop.



4. In order to supply quality leaf, tobacco must be planted on the lighter and less fertile type of soil in districts reasonably free of frosts, with good summer rainfall and humid conditions.

5. Considerable areas in South Australia appear fairly well suited to tobacco, except for the absence of regular summer rainfall. For this reason growers are strongly recommended to provide means for irrigation.

6. The species of tobacco commonly grown is *Nicotiana tabacum*.

7. There are two types of tobacco, namely, Virginian and Burley. The former is more popular, the chief varieties being Warne, White Stem Orinoco, Hickory Prior. The latter is increasing in popularity for soils of the heavier type, and best varieties are Judy's Pride and Standing Resistant.

8. Tobacco does not thrive in sour soil, and new land should not be immediately planted with this crop.

9. Whilst it is not an exhausting crop, tobacco should be planted in rotation with pasture, such as subterranean clover.

10. Thorough soil preparation is essential.

11. Tobacco requires liberal manuring with phosphoric acid, and usually the addition of nitrogen and potash are of benefit. Applications of up to 10cwt. 45 grade superphosphate or 8cwt. of complete fertiliser have proved economic.

12. The manure may be applied before setting out, at transplanting, or after the plants are established, whilst probably a combination of all three times will produce best results.

13. Particular attention must be given to preparation of the seedbeds.

14. In order to destroy disease spores, injurious pests, &c., the seedbed soil should be sterilised by fire or fumigation.

15. As a safeguard against accident, at least twice or even three times the seedbed area required to provide seedlings for the field should be prepared.

16. One (1) ounce of seed should provide plants for 7 acres of land. 100 square feet of seedbed area are required per acre of land to be planted.

17. The seed must be only lightly buried.

18. The beds should be sheltered by protective coverings, and kept regularly moistened.

19. If plants are too thick in the seedbeds, they should be thinned out to allow for healthy development, and, if backward, may be assisted by the addition of liquid manure.

20. For some time before transplanting the protective coverings should be gradually removed, and the seedlings hardened off.

21. The time of transplanting will vary with the district, and in the Adelaide Hills November appears to be the most suitable month.

22. If possible, choose cool, cloudy weather, and in warmer conditions the young plants should be shaded after setting out.

23. On the average seedlings are spaced about a yard apart in each direction, when approximately 5,000 plants are required per acre.

24. Seedlings may be effectively set out either by hand or transplanting machine, but if the latter is employed the soil should be in a fine state of division, and free of roots, sticks, or other rubbish.

25. Tobacco responds to thorough tillage of the planted field, and whenever weeds or surface crust renders cultivation advisable, the operation should not be delayed.

26. As the summer rainfall in this State is irregular, irrigation water should be available and applied by means of furrows whenever the condition of the plants indicates their requirement for moisture.

27. Irrigation water should not be applied after the topping of the plants.

28. In topping, no leaf of less than about 1ft. in length and 5in. in width is worthy of being left on the plant for harvesting. An average number of leaves left is from eight to 10.



29. Plants usually commence to ripen about four weeks after topping. Heavy topping hastens ripening, and light topping delays ripening.

30. The suckers that spring from the axes of the leaves after topping must be kept rubbed off, or the quality of the leaf is affected.

31. The ripening of the leaves is indicated by characteristic changes in the color, texture, crispness, &c.

32. The plants should have completed their growth by the middle of February to allow for ripening of the leaf in suitable climatic conditions.

33. It is important that the leaf be thoroughly matured, but not over-ripe, before harvesting.

34. The leaf must be picked in suitable weather conditions for best results. Wet or wilted tobacco leaf is not desirable.

35. The method of hanging the leaves in the curing barn is to attach them to sticks by means of tying or threading on projecting wire pins.

36. Curing barns may be built of a variety of materials, but must have special provision for heating and ventilating.

37. The dimensions for most barns in this State are 12ft. by 12ft. by 20ft.

38. A barn of this size is capable of curing leaf from about 5 acres of crop.

39. The operation of flue-curing can only be thoroughly learned by practical experience.

40. The curing process involves three distinct stages, namely, yellowing the leaf, fixing the color, and drying the leaf.

41. For the production of bright colored leaf particular attention must be given to the yellowing process by making sure that the correct shade of color is secured before the temperatures are raised and the next stage commenced.

42. The sponging or condensing of moisture on the leaves is preferable to scalding or reddening, due to too rapid increase in temperature and ventilation.

43. When drying the leaf, the midrib must be thoroughly dried out, otherwise mould is likely to develop in the bulk.

44. Many variations occur in the curing process, according to the condition of the leaf when harvested.

45. On completion of curing the leaves are dry and brittle, and, to avoid damage, must be allowed to absorb moisture before being removed.

46. Upon removal from the barn the leaf is bulked down, during which it passes through a mild ferment and improves in quality.

47. In the preparation of leaves for market tobacco is graded into various classes, according to color, texture, size, and soundness. The highest grade is a lemon-yellow color with light bodied, thin, elastic texture, and large, sound leaf.

48. Green leaf has no value.

49. The graded leaf is made up into small bundle containing from 15 to 20 leaves, called hands.

50. The hands are packed in hessian packages, termed bales, about 3ft. by 1½ft. by 2ft., and weighing approximately 200lbs.

51. The tobacco buyer visits the farm of the grower and submits prices for the leaf submitted.

52. The prices in South Australia range from 3s. 2d. to 6d. per lb., with some leaf rejected.

53. The average yield to-day is probably not more than 4cwts. per acre.

54. With irrigation and added experience the average yield is likely to increase to 6cwts. to 7cwts. per acre.

55. Lucerne flea frequently causes damage in the seedbeds. Treatment consists of dusting with 2 per cent. nicotine dust.

56. Cut worms are at times destructive of seedlings set out in the field. The method of control is poisoning with Paris green and bran baits.



57. Bud worms may devour the heart and tender leaves of tobacco plants. They may be checked by dusting with powder containing 10 per cent. arsenate of lead.

58. Leaf miners and stem borers are difficult to control.

59. Pickling the seed in a 10 per cent. formalin solution for 15 minutes, then washing at least three times in clear water and thoroughly drying, tends to prevent infection by seed-borne diseases.

60. The most serious disease in Australia is blue mould. No method of control has been discovered. Treatment must be largely preventative, consisting of endeavoring to keep the seedbeds in such condition of moisture and temperature as to be unfavorable to the development of the disease.

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## NARRUNG HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR MAY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                         | Butterfat.           |                     |                         | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|-------------------------|----------------------|---------------------|-------------------------|---------------|
|          |                              |                              | Per Herd during May. | Per Cow during May. | Per Cow October to May. | Per Herd during May. | Per Cow during May. | Per Cow October to May. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                    | Lbs.                 | Lbs.                | Lbs.                    | %             |
| 5/C...   | 30                           | 22-65                        | 13,309½              | 443-65              | 3,632-80                | 672-17               | 22-41               | 180-24                  | 5-05          |
| 5/D...   | 29-08                        | 11-94                        | 7,534½               | 259-54              | 3,092-33                | 416-47               | 14-35               | 166-64                  | 5-53          |
| 5/E...   | 35-77                        | 27-10                        | 12,285               | 343-44              | 3,875-49                | 652-09               | 18-23               | 174-44                  | 5-31          |
| 5/J...   | 21-45                        | 16-35                        | 9,348½               | 435-73              | 2,777-27                | 468-58               | 21-85               | 147-00                  | 5-01          |
| 5/O...   | 24-28                        | 11-84                        | 6,521                | 268-79              | 3,801-90                | 356-16               | 14-68               | 204-24                  | 5-46          |
| 5/R...   | 54                           | 36-68                        | 10,653½              | 197-28              | 2,521-63                | 463-15               | 8-58                | 107-46                  | 4-35          |
| 5/S...   | 30                           | 21-77                        | 14,923               | 497-44              | 3,108-51                | 719-52               | 23-98               | 153-86                  | 4-82          |
| 5/T...   | 20                           | 14-71                        | 10,358               | 517-90              | 4,108-29                | 492-69               | 24-63               | 188-96                  | 4-76          |
| 5/U...   | 21                           | 14-13                        | 12,980               | 617-14              | 5,097-82                | 547-02               | 27-00               | 224-49                  | 4-38          |
| 5/Y...   | 25-03                        | 21-45                        | 12,162½              | 485-91              | 4,634-69                | 704-12               | 28-13               | 249-53                  | 5-79          |
| 5/Z...   | 27-19                        | 18-45                        | 17,464½              | 642-31              | 5,138-98                | 873-95               | 32-14               | 246-85                  | 5-01          |
| 5/AA...  | 18                           | 17-06                        | 8,126½               | 451-47              | 3,570-30                | 504-51               | 23-03               | 189-86                  | 6-21          |
| 5/CC...  | 29-61                        | 18-26                        | 11,055               | 373-35              | 2,487-29                | 487-34               | 16-46               | 109-46                  | 4-41          |
| 5/DD...  | 21                           | 15-81                        | 7,826½               | 372-69              | 3,768-69                | 457-77               | 21-80               | 201-30                  | 5-85          |
| 5/EE...  | 14                           | 10                           | 2,587½               | 181-25              | 4,215-76                | 182-61               | 11-62               | 209-18                  | 6-41          |
| 5/II...  | 25                           | 16                           | 8,092½               | 324-47              | 4,257-29                | 430-78               | 17-27               | 203-87                  | 5-32          |
| 5/J...   | 38-87                        | 24-97                        | 15,977½              | 471-78              | 4,172-15                | 699-45               | 20-65               | 159-85                  | 4-38          |
| 5/KK...  | 22                           | 19-29                        | 13,782               | 624-18              | 4,272-89                | 657-37               | 29-88               | 195-70                  | 4-79          |
| 5/MM...  | 18-90                        | 12-90                        | 6,384½               | 459-31              | 4,410-23                | 347-18               | 24-98               | 231-42                  | 5-44          |
| 5/NN...  | 25-61                        | 25-06                        | 11,570½              | 404-42              | 4,145-97                | 576-09               | 20-14               | 168-06                  | 4-98          |
| 5/OO...  | 21                           | 19-10                        | 9,727½               | 463-21              | 4,214-73                | 485-73               | 20-75               | 198-20                  | 4-48          |
| Means.   | 25-94                        | 18-83                        | 10,597-52            | 408-55              | 3,731-64                | 530-70               | 20-46               | 181-49                  | 5-01          |

## THE HILLS HERD TESTING ASSOCIATION.

### RESULTS OF BUTTERFAT TESTS FOR MAY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                      | Butterfat.           |                     |                      | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|---------------|
|          |                              |                              | Per Herd during May. | Per Cow during May. | Per Cow July to May. | Per Herd during May. | Per Cow during May. | Per Cow July to May. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                 | Lbs.                 | Lbs.                | Lbs.                 | %             |
| 7/D...   | 23                           | 21                           | 11,888½              | 516-89              | 6,761-84             | 488-58               | 21-03               | 232-93               | 4-07          |
| 7/E...   | 26                           | 19-23                        | 8,903½               | 338-69              | 6,746-15             | 384-06               | 14-76               | 232-13               | 4-25          |
| 7/H...   | 8                            | 7-10                         | 4,666                | 583-25              | 7,096-16             | 240-51               | 30-06               | 340-58               | 5-15          |
| 7/J...   | 20                           | 18-77                        | 11,728½              | 586-43              | 6,609-41             | 535-25               | 26-76               | 308-24               | 4-66          |
| 7/K...   | 18                           | 12-81                        | 7,575½               | 420-86              | 7,576-19             | 801-71               | 16-76               | 324-52               | 3-96          |
| 7/L...   | 34                           | 24-13                        | 10,100½              | 297-07              | 5,091-94             | 470-21               | 15-77               | 244-32               | 4-66          |
| 7/O...   | 15-65                        | 11-68                        | 3,893½               | 248-78              | 4,527-16             | 193-66               | 12-87               | 217-82               | 4-97          |
| 7/S...   | 10-87                        | 11-77                        | 10,457               | 619-75              | 5,960-80             | 553-84               | 32-82               | 316-03               | 5-30          |
| 7/V...   | 11                           | 10-68                        | 7,187                | 653-36              | 5,211-86             | 324-38               | 29-48               | 248-66               | 4-51          |
| 7/T...   | 10                           | 8-23                         | 3,472½               | 347-25              | 5,552-43             | 152-48               | 15-25               | 234-60               | 4-89          |
| 7/W...   | 20-61                        | 16-06                        | 10,814               | 524-69              | 6,837-60             | 480-41               | 23-31               | 307-65               | 4-44          |
| 7/X...   | 15                           | 10-39                        | 7,204½               | 480-31              | 6,875-14             | 320-78               | 21-38               | 285-67               | 4-46          |
| 7/Y...   | 22                           | 21-13                        | 9,108½               | 414-02              | 5,195-47             | 422-22               | 19-19               | 246-62               | 4-64          |
| 7/Z...   | 18                           | 11                           | 8,494                | 653-38              | 5,610-58             | 361-81               | 27-83               | 246-69               | 4-26          |
| 7/AA...  | 7-87                         | 7-42                         | 3,277                | 416-39              | 5,006-64             | 163-17               | 20-73               | 252-06               | 4-98          |
| 7/BB...  | 15                           | 13-94                        | 9,681½               | 645-43              | 6,534-20             | 424-60               | 28-31               | 275-88               | 4-40          |
| 7/DD...  | 11                           | 9                            | 5,058                | 459-36              | 6,421-76             | 254-07               | 23-10               | 319-43               | 5-03          |
| 7/EE...  | 23                           | 13-03                        | 3,898½               | 169-50              | 4,072-09             | 173-87               | 7-55                | 170-14               | 4-45          |
| 7/GG...  | 14                           | 12                           | 3,999                | 285-84              | 4,753-52             | 192-60               | 13-76               | 245-10               | 5-27          |
| 7/HH...  | 16                           | 13-55                        | 6,591½               | 411-97              | 5,369-84             | 295-60               | 18-48               | 237-08               | 4-48          |
| 7/II...  | 14                           | 12-42                        | 7,757½               | 554-11              | Aug.-May<br>5,355-32 | 358-31               | 25-59               | Aug.-May<br>254-31   | 4-62          |
| 7/JJ...  | 19                           | 19                           | 10,338½              | 544-13              | Jan.-May<br>2,984-47 | 461-13               | 24-27               | Jan.-May<br>131-94   | 4-44          |
| Means.   | 16-95                        | 13-83                        | 7,545-23             | 445-03              | 5,948-73             | 343-09               | 20-24               | 289-52               | 4-55          |



## LAKE ALBERT HERD TESTING ASSOCIATION.

## RESULTS OF BUTTERFAT TESTS FOR MAY, 1931.

| Herd No. | Average No. of Cows in Herd. | Average No. of Cows in Milk. | Milk.                |                     |                          | Butterfat.           |                     |                          | Average Test. |
|----------|------------------------------|------------------------------|----------------------|---------------------|--------------------------|----------------------|---------------------|--------------------------|---------------|
|          |                              |                              | Per Herd during May. | Per Cow during May. | Per Cow December to May. | Per Herd during May. | Per Cow during May. | Per Cow December to May. |               |
|          |                              |                              | Lbs.                 | Lbs.                | Lbs.                     | Lbs.                 | Lbs.                | Lbs.                     | %             |
| 6/B ...  | 20                           | 11-16                        | 6,359                | 317-95              | 1,499-83                 | 259-59               | 12-98               | 65-27                    | 4-08          |
| 6/C ...  | 17-35                        | 10-26                        | 7,820½               | 439-22              | 2,084-11                 | 293-21               | 16-90               | 87-06                    | 3-85          |
| 6/F ...  | 21-87                        | 13-13                        | 13,085½              | 598-33              | 2,550-19                 | 587-79               | 26-88               | 116-19                   | 4-49          |
| 6/H ...  | 19-71                        | 8-06                         | 3,796½               | 192-62              | 2,002-97                 | 176-49               | 8-95                | 91-41                    | 4-65          |
| 6/O ...  | 20                           | 12-71                        | 4,919                | 245-95              | 2,317-92                 | 278-84               | 18-94               | 117-97                   | 5-67          |
| 6/E ...  | 20                           | 18-06                        | 9,653                | 482-65              | 1,654-92                 | 456-43               | 22-82               | 85-22                    | 4-74          |
| 6/U ...  | 18                           | 15                           | 5,099½               | 283-81              | 2,038-47                 | 265-74               | 14-76               | 89-10                    | 5-21          |
| 6/W ...  | 21-45                        | 14-45                        | 7,990½               | 372-51              | 2,684-68                 | 368-87               | 17-20               | 122-89                   | 4-62          |
| 6/Y ...  | 14                           | 9-26                         | 4,706½               | 336-18              | 2,285-03                 | 207-00               | 14-79               | 100-39                   | 4-40          |
| 6/Ea ... | 55                           | 42-03                        | 21,391               | 389-38              | 2,782-32                 | 967-12               | 17-58               | 118-72                   | 4-54          |
| 6/II ... | 35-13                        | 27-39                        | 16,164½              | 518-24              | 3,461-98                 | 824-34               | 23-51               | 153-14                   | 4-63          |
| 6/EK ... | 27-68                        | 21-81                        | 14,156               | 511-42              | 3,313-19                 | 637-15               | 23-02               | 148-38                   | 4-50          |
| 6/LL ... | 24                           | 21-71                        | 13,245               | 551-87              | 3,627-05                 | 543-58               | 22-65               | 155-44                   | 4-10          |
| 6/MM ... | 14                           | 9-84                         | 6,090                | 435-00              | 2,204-26                 | 295-61               | 21-12               | 105-93                   | 4-85          |
| 6/Oo ... | 19-77                        | 14-58                        | 10,644½              | 538-42              | 3,752-29                 | 475-02               | 24-03               | 168-51                   | 4-46          |
| 6/PP ... | 20                           | 19                           | 9,653                | 482-65              | 3,681-51                 | 468-91               | 23-45               | 176-13                   | 4-86          |
| 6/QQ ... | 20-23                        | 23-03                        | 21,581               | 738-88              | 4,418-95                 | 884-11               | 30-28               | 190-83                   | 4-09          |
| 6/RR ... | 31-71                        | 26-48                        | 21,988               | 693-53              | 4,147-35                 | 977-76               | 30-85               | 183-25                   | 4-41          |
| 6/Ss ... | 25                           | 23                           | 16,802               | 672-08              | 4,956-43                 | 672-02               | 26-88               | 198-75                   | 4-00          |
| 6/Tt ... | 25                           | 20-35                        | 12,094               | 483-76              | 2,967-65                 | 597-50               | 23-90               | 139-54                   | 4-94          |
| 6/Uu ... | 37-06                        | 23-65                        | 15,865½              | 428-10              | 2,798-09                 | 660-69               | 17-83               | 120-88                   | 4-16          |
| 6/Vv ... | 20                           | 19                           | 13,604½              | 680-23              | Jan.-May<br>3,427-12     | 577-23               | 23-86               | Jan.-May<br>157-65       | 4-24          |
| Means    | 24-36                        | 18-82                        | 11,750-41            | 482-33              | 3,037-49                 | 521-59               | 21-41               | 135-07                   | 4-44          |

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## THE MARKETING OF EGGS

(WITH SPECIAL REFERENCE TO THE OVERSEAS EXPORT TRADE).

[By C. F. ANDERSON, Government Poultry Expert.]

With the expansion of the poultry industry throughout the Commonwealth and the approach of the coming export season a general review of the egg position, with special reference to South Australia, should not be out of place.

The poultry industry throughout Australia has made very rapid advancement, especially during the last five years, and with more attention being paid to the production of eggs as a sideline on a large number of our farms, the surplus available for export will be greatly increased.

The history of the poultry industry in South Australia and the marketing of eggs, especially up to the last four to five years, has been purely an Australian industry, without any attention being paid to the export of eggs overseas. For a long number of years, principally owing to the fact that eggs on the wheat farms have been produced cheaply, and where poultry have foraged in the fields for a large percentage of their food, these eggs have been exported to the Eastern States, chiefly Sydney, in the form of egg pulp for use by pastrycooks for cake and biscuit making. With the expansion of the industry in the Eastern States, the interstate market for South Australian pulp is being gradually closed, until we have now reached the stage when we are forced to look elsewhere for a market for our pulp.

The only market at the present time is England, with a possibility of small sales being made to Canada. It is, however, doubtful whether we can profitably compete with foreign countries, especially China (which is a very large exporter of egg pulp) on the London market.

There is, however, another view to be taken, and that is whether the export of eggs in the shell can be increased, and if so, whether there is a profitable outlet for them. Statistics prepared by the Department of Markets for the three years ending 1929 show the total imports of eggs into Great Britain and Australia's share of same as follows:—

### *Total Imports into United Kingdom.*

| 1927.<br>Doz. | 1928.<br>Doz. | 1929.<br>Doz. |
|---------------|---------------|---------------|
| 2,028,362,500 | 2,205,540,000 | 2,080,360,000 |

### *Australia's Share.*

| 1927.<br>Doz. | 1928.<br>Doz. | 1929.<br>Doz. |
|---------------|---------------|---------------|
| 1,018,100     | 2,225,000     | 3,126,270     |

For the three years, therefore, Great Britain imported a total of 6,314,262,500 dozen, and Australia only supplied 6,369,370 dozens. It is interesting, however, to note that from 1927 to 1929 Australia's exports of eggs trebled, and is still rapidly increasing. On studying the above figures it seems reasonable to assume that Australia's exports of eggs can be safely increased.

Poultry as a sideline on our wheat farms should be largely extended, for there are several advantages possessed by our farmers. We have in South Australia one of the finest climates in the world for egg production, the feeding costs can be reduced to a minimum for the reason that the bulk of the food necessary for egg production is produced on every farm of the State, in addition to the amount of food the fowls are able to get by foraging in the fields, and again we have some of the best laying stock in our White Leghorns and Black Orpingtons that can be found in any part of the world. In any future extension, however, that takes place it must be kept in mind that the market



for our surplus must be found outside Australia, and in this direction the future of the poultry industry as far as South Australia is concerned depends solely on whether we are able to produce, and, more important, market an egg which will come up to export standard as laid down in the Commonwealth regulations referring to the export of eggs.

The outlet for our exports is in two forms:—

A. Eggs in shell.

B. Egg pulp.

We look, naturally, to the form of export which will be the more profitable, and on studying figures for the last three years, it will be found that export eggs in the shell have returned to the producer a net return of 1s. per dozen, while egg pulp would have returned from 6d. to 6½d. per dozen. In other words, eggs exported as eggs in the shell are worth practically twice as much as eggs exported in the form of pulp. It is safe to assume that as regards egg pulp, it is doubtful whether it can be profitably exported, but for eggs in shell there is every reason to believe that a remunerative return can be obtained. It has been definitely shown during the last five years that eggs can be marketed in South Australia quite suitable for export. In this direction it is interesting to note that last season our egg exports reached the record of 25,000 cases, and the indications are that for this coming season approximately 40,000 cases will be shipped.

The normal export season is from early in July until the end of November, and as this period happens to be our heaviest period of production, we are placed in a very favorable position.

The weakness in the poultry industry from the farmer's viewpoint is the long delay in the time of the eggs being received on the city packing floors from when they are laid. Eggs to be suitable for export should reach the packing floors at least four to five days after being laid. The eggs should be collected at least twice a day, and oftener if possible. The more frequently the eggs are collected the better the opportunity of keeping the eggs clean. For instance, eggs laid in the morning and not collected until evening time are liable to become dirty shelled by the other birds going in and out of the nests. Export regulations demand that all eggs shall be clean shelled. The nests should be cleaned regularly and a plentiful supply of clean sand or shell grit should be provided. Straw is not suitable owing to the fact that the straw often badly stains the shell of the egg, and straw stains are very difficult to remove. The eggs should be packed in either cardboard fillers or clean dry cocky chaff for transport to the city; dirty packing material causes the eggs to become dirty and unsuitable for export.

All surplus male birds should be either penned off separately or marketed. Infertile eggs—that is, eggs produced by unmated hens—will keep under proper storage conditions for weeks, while fertile eggs rapidly lose their quality, especially during the warmer weather.

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Special attention should also be paid to the production of full-sized 2oz. eggs and over. The small 1½oz. egg and under threaten to become a serious menace to the poultry industry. It is folly to export a 1½oz. egg 14,000 miles to London, where they come into competition with the small eggs produced by foreign countries. They are a reflection on the ability of our poultry farmers when it is realised that every egg that leaves Australia for England must be branded with the word "Australia." It is not the small 1½oz. egg on which a profitable and lasting export trade is going to be built, but it is the 2oz. egg and over which is going to favorably entrench the Australian eggs on the London market.

To briefly summarise, the requirements for export eggs are:—

1. The full-sized 2oz. egg and over.
2. All eggs to be perfectly clean-shelled.
3. Eggs to arrive at the packing floors not more than five to six days old.
4. Every extra egg exported has a stabilising effect on our local market for the remainder of the year.

## STATE OF SOUTH AUSTRALIA.

### ACREAGE OF CROPS, SEASON 1931-1932.

The Government Statist reports having completed an estimate of the probable acreage either sown or intended to be sown with cereals for the season 1931-1932. This estimate is based on returns received from farmers in each agricultural hundred of the State.

Following the usual practice, further reports will be obtained after all sowing is completed, when the whole of the figures will be reviewed for a further estimate to be issued in September.

#### *Estimated Wheat Acreage.*

| Division.           | Actual,<br>1930-31. | Estimated,<br>1931-32. | Increase. |
|---------------------|---------------------|------------------------|-----------|
| Central .....       | 708,915             | 695,000                | — 13,915  |
| Lower North .....   | 933,983             | 915,000                | — 18,983  |
| Upper North .....   | 358,778             | 390,000                | + 33,222  |
| South-Eastern ..... | 71,984              | 60,000                 | — 11,984  |
| Western .....       | 1,264,450           | 1,175,000              | — 89,450  |
| Murray Mallee ..... | 1,171,103           | 1,065,000              | —106,103  |
| Total State .....   | 4,507,213           | 4,300,000              | —207,213  |

When it is recalled that the area sown last season, 4,507,213 acres, was substantially a record, the decrease of 207,000 acres, or 5 per cent., this season, is insignificant. The increase from 1925-1926 had been continuous and substantial, as follows:—1925-26, 2,750,873 acres; 1926-27, 3,003,667; 1927-28, 3,324,983 acres, 1928-29, 3,775,601 acres; 1929-30, 3,987,310; 1930-31, 4,507,213 acres.

*Barley*.—Actual, 1930-31, 267,369 acres; estimated, 1931-32, 240,000.

*Oats*.—Actual, 1930-31, 519,300 acres; estimated, 1931-32, 522,500.

*Area Fallowed*.—The area fallowed during 1930-31 for the 1931-32 crops was 2,513,000 acres. The substantial increase since 1925-26 is shown as follows:—1925-26, 1,885,753 acres; 1926-27, 2,099,979 acres; 1927-28, 2,169,483 acres; 1928-29, 2,199,231 acres; 1929-30, 2,293,964 acres; and 1930-31, 2,513,000 acres.

*Five Years' Clearing of New Land*.—During the five years to 1929-30 886,381 acres have been cleared in the Western Division, 225,782 during 1929-30; and 725,301 acres in the Murray Mallee Division, 138,233 acres during 1929-30. The total for the whole State is 1,726,258 acres and 392,168 acres for year 1929-30.



## RED COMB EGG ASSOCIATION.

## OFFICIAL SINGLE TEST.

## EGG-LAYING COMPETITION, 1931-32.

Conducted at the Parafield Poultry Station under the Supervision of the Department of Agriculture.

Total No. of Pens.—Section 1, White Leghorns—141 birds. Section 2, Black Minoras—9 birds. Section 3, Black Orpington—57 birds.

Twelve Months Test. To start on April 1st, 1931.

Section 1.—White Leghorns.

| Competitor.             | Address.            | Score for Month ended June 30th, 1931. |                         |                         | Totals. |
|-------------------------|---------------------|----------------------------------------|-------------------------|-------------------------|---------|
|                         |                     | Bird No. and Eggs Laid.                | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. |         |
| Barker, C. R. ....      | Edwardstown.....    | (1) 60                                 | (2) 57                  | (3) 56                  | 173     |
| Hartmann, S. ....       | Salisbury .....     | (4) 49                                 | (5) 43                  | (6) 42                  | 134     |
| Hartmann, S. ....       | Salisbury .....     | (7) 52                                 | (8) 51                  | (9) 50                  | 153     |
| Cooper, F. E. ....      | Edwardstown.....    | (10) 17                                | (11) 13                 | (12) 45                 | 75      |
| Cooper, S. ....         | Edwardstown.....    | (13) 56                                | (14) 54                 | (15) 41                 | 151     |
| Cooper, S. ....         | Edwardstown.....    | (16) 8                                 | (17) 43                 | (18) 56                 | 107     |
| Hutton, Mrs. M. E. .... | Clarence Park ....  | (19) 57                                | (20) 64                 | (21) 42                 | 163     |
| Easther, C. J. ....     | Black Forest .....  | (22) 51                                | (23) 59                 | (24) 65                 | 175     |
| Tolhurst, A. E. ....    | Torrens Park .....  | (25) 53                                | (26) 55                 | (27) 60                 | 168     |
| Tolhurst, A. E. ....    | Torrens Park .....  | (28) 56                                | (29) 44                 | (30) 31                 | 131     |
| Fidge, H. ....          | Clarence Park ....  | (31) 32                                | (32) 64                 | (33) 36                 | 132     |
| Fidge, H. ....          | Clarence Park ....  | (34) 9                                 | (35) 55                 | (36) 25                 | 89      |
| Burton, C. J. C. ....   | Mallala .....       | (37) 48                                | (38) 62                 | (39) 55                 | 165     |
| Earl Bros. ....         | Mallala .....       | (40) 18                                | (41) 42                 | (42) 10                 | 70      |
| Duhring, T. ....        | Mallala .....       | (43) 47                                | (44) 31                 | (45) 39                 | 117     |
| Stanton, L. O. ....     | Warradale .....     | (46) 57                                | (47) 47                 | (48) 43                 | 147     |
| Barrett, L. ....        | Angaston .....      | (49) 51                                | (50) 48                 | (51) 57                 | 156     |
| Kappler, C. E. ....     | Ascot Park .....    | (52) —                                 | (53) —                  | (54) —                  | —       |
| Kappler, C. E. ....     | Ascot Park .....    | (55) —                                 | (56) —                  | (57) —                  | —       |
| Harnden, W. R. ....     | Kersbrook .....     | (58) 39                                | (59) 43                 | (60) 42                 | 124     |
| Lamerton, E. A. ....    | Edwardstown.....    | (61) 18                                | (62) 56                 | (63) 42                 | 116     |
| Williams, W. R. ....    | Frewville .....     | (64) 56                                | (65) 45                 | (66) 46                 | 147     |
| Heath, H. E. ....       | Mile End.....       | (67) 42                                | (68) 27                 | (69) 45                 | 114     |
| Gurr, A. & H. ....      | Scott's Creek ..... | (70) 59                                | (71) 56                 | (72) 4                  | 119     |
| Gavin, G. C. ....       | Salisbury .....     | (73) 29                                | (74) 10                 | (75) 24                 | 63      |
| Gavin, G. C. ....       | Salisbury .....     | (76) 28                                | (77) 9                  | (78) 58                 | 95      |
| Gavin, G. C. ....       | Salisbury .....     | (79) 45                                | (80) 44                 | (81) 42                 | 131     |
| Gavin, G. C. ....       | Salisbury .....     | (82) 46                                | (83) 31                 | (84) 61                 | 138     |
| Robinson, A. E. ....    | Hectorville .....   | (85) 20                                | (86) 41                 | (87) 46                 | 107     |
| Brown, C. D. ....       | Morphettville ..... | (88) 41                                | (89) 37                 | (90) 43                 | 121     |
| Riggs, N. ....          | Camden .....        | (91) 40                                | (92) 46                 | (93) 20                 | 106     |
| Anderson, J. ....       | Warradale .....     | (94) 48                                | (95) 24                 | (96) 30                 | 102     |
| Rasmussen, H. A. ....   | Ethelton .....      | (97) 49                                | (98) 45                 | (99) 48                 | 142     |
| Parker, S. J. H. ....   | Alberton .....      | (100) 54                               | (101) 47                | (102) 46                | 147     |
| Hutchinson, A. S. ....  | Athelstone .....    | (103) 53                               | (104) 51                | (105) 55                | 159     |
| Thomas, C. R. ....      | Hectorville .....   | (106) 51                               | (107) 49                | (108) 48                | 148     |
| Urlwin, A. P. ....      | Balaklava .....     | (109) 37                               | (110) 34                | (111) 50                | 121     |
| Wiese, W. ....          | Cabra .....         | (112) 52                               | (113) 57                | (114) 48                | 157     |
| Wiese, W. ....          | Cabra .....         | (115) 47                               | (116) 46                | (117) 50                | 143     |
| Williams, W. R. ....    | Frewville .....     | (118) 59                               | (119) 21                | (120) 56                | 136     |
| Williams, W. R. ....    | Frewville .....     | (121) 65                               | (122) 60                | (123) 56                | 181     |
| Marsh, C. A. ....       | Gawler .....        | (124) 52                               | (125) 53                | (126) 66                | 171     |



*Egg-Laying Competition.—Section 1.—White Leghorns—continued.*

| Competitors.        | Address.           | Score for Month ended June 30th, 1931. |                         |                         |         |
|---------------------|--------------------|----------------------------------------|-------------------------|-------------------------|---------|
|                     |                    | Bird No. and Eggs Laid.                | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals. |
| Cleland, W. L. .... | Beaumont.....      | (127) 62                               | (128) 51                | (129) 58                | 171     |
| Cleland, W. L. .... | Beaumont .....     | (130) 64                               | (131) 63                | (132) 52                | 179     |
| Sage, H. R. ....    | Nuriootpa .....    | (133) 60                               | (134) 54                | (135) 48                | 162     |
| Vowels, C. C. ....  | Westbourne Park .. | (136) 53                               | (137) 57                | (138) 56                | 166     |
| George, L. E. ....  | Redfern .....      | (139) 5                                | (140) 58                | (141) 53                | 116     |
| Totals.....         | .....              | 1,995                                  | 2,047                   | 2,046                   | 6,088   |

*Section 2.—Black Minorcas.*

| Competitor.          | Address.        | Score for Month ended June 30th, 1931. |                         |                         |        |
|----------------------|-----------------|----------------------------------------|-------------------------|-------------------------|--------|
|                      |                 | Bird No. and Eggs Laid.                | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals |
| Gameau, V. F. ....   | Woodville ..... | (142) 21                               | (143) 56                | (144) 19                | 96     |
| Williams, W. R. .... | Frewville ..... | (145) 13                               | (146) 5                 | (147) 22                | 40     |
| Earl Bros. ....      | Mallala .....   | (148) 15                               | (149) 11                | (150) 15                | 41     |
| Totals.....          | .....           | 49                                     | 72                      | 56                      | 177    |

*Section 3.—Black Orpingtons.*

| Competitor.               | Address.            | Score for Month ended June 30th, 1931. |                         |                         |        |
|---------------------------|---------------------|----------------------------------------|-------------------------|-------------------------|--------|
|                           |                     | Bird No. and Eggs Laid.                | Bird No. and Eggs Laid. | Bird No. and Eggs Laid. | Totals |
| Southon, Mrs. E. ....     | Clarence Gardens .. | (187) 35                               | (188) 3                 | (189) 23                | 61     |
| Gameau, V. F. ....        | Woodville .....     | (190) 45                               | (191) 38                | (192) 10                | 93     |
| Williams, W. R. ....      | Frewville .....     | (193) 59                               | (194) 61                | (195) 79                | 199    |
| Pillar, L. A. ....        | Hamley Bridge ..    | (196) 46                               | (197) 58                | (198) 52                | 156    |
| Aird, J. R., & Son .....  | Kilkenny .....      | (199) 28                               | (200) 64                | (201) 5                 | 97     |
| Aird, J. R., & Son .....  | Kilkenny .....      | (202) 15                               | (203) 29                | (204) 8                 | 52     |
| Wade, A. E. ....          | Marion .....        | (205) 45                               | (206) 53                | (207) 6                 | 104    |
| Tolhurst, A. E. ....      | Torrens Park .....  | (208) 32                               | (209) 71                | (210) 43                | 146    |
| Tolhurst, A. E. ....      | Torrens Park .....  | (211) 70                               | (212) 72                | (213) 21                | 163    |
| Compton, R. C. ....       | Woodforde .....     | (214) 69                               | (215) 73                | (216) 36                | 178    |
| Southon, Mrs. E. ....     | Clarence Gardens .. | (217) 25                               | (218) 37                | (219) 30                | 92     |
| Heath, H. E. ....         | Mill End .....      | (220) 35                               | (221) 43                | (222) 23                | 101    |
| Wittenburg, W. H. L. .... | Goodwood .....      | (223) 52                               | (224) 36                | (225) 18                | 106    |
| Gurr, A. & H. ....        | Scott's Creek ..... | (226) 53                               | (227) 14                | (228) 17                | 84     |
| Robinson, A. E. ....      | Hectorville .....   | (229) 46                               | (230) 24                | (231) 49                | 119    |
| Smart, H. J. ....         | Grovene .....       | (232) 7                                | (233) 25                | (234) 14                | 46     |
| Williams, W. R. ....      | Frewville .....     | (235) 28                               | (236) 15                | (237) 21                | 64     |
| Williams, W. R. ....      | Frewville .....     | (238) 23                               | (239) 39                | (240) 35                | 97     |
| Osborn, E. L. ....        | Camden .....        | (241) 45                               | (242) 74                | (243) 30                | 149    |
| Totals .....              | .....               | 758                                    | 829                     | 520                     | 2,107  |



## ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR JULY.

[By CHAS H. BEAUMONT, District Horticultural Instructor.]

The splendid rains have given the new season an excellent start, better than we have seen for the past five years; the subsoil should have a good storage to carry the trees through the year and enable them to produce a big crop of fruit. It now remains for us to see that that crop is of high grade.

Pruning should be proceeded with and completed as early as possible, being careful to leave as much wood as we can for fruiting, and also careful to do away with any wood likely to harbor disease, such as broken ends, and so on. Vines should certainly be able to carry more wood than last season. When selecting rods try and get good, healthy wood in such a position that it will be easily handled by those who have to secure it to the supports, and will be safe from the work of the cultivators; clean the vines as much as possible to prevent fungous troubles.

Get all cuttings burned or carted away as soon as practicable.

Destroy all wasting fruits and leave drying racks open to the birds.

Do not allow water to remain stagnant about trees or vines or strawberry beds.

The first chance that offers, try out the practice of using a fungicide to assist in controlling curl leaf, shot hole, scab, &c., using winter strength Bordeaux Mixture, or use bluestone alone; it will not prevent good work if the trees are wet, but rain will spoil its effectiveness.

Finish planting whenever the day is fine enough for the soil to be friable; do not continue the work when the soil is sloppy.

Tomato houses require constant attention if disease is to be controlled. Take out and destroy all sickly plants. Keep the house and the surroundings free from weeds. For cut worms or other caterpillars use arsenate of lead spray or dust, and for white fly use black leaf 40 or nicodust 3 per cent. Drain all excess water from about the houses.

Wet days afford an opportunity to make sure that the spray outfit is ready for service.

Treat vines affected by anthracnose thoroughly and save loss later on; ask for instruction if required.

**M. F. HODGE, A.C.I.V.**

**LICENSED LAND VALUATOR AND AGENT,**

**42, GRENFELL BUILDINGS, GRENFELL STREET, ADELAIDE.**

'Phone: Cent. 3931.

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**SPECIALIZE IN COUNTRY VALUATIONS.**

**LOWEST QUOTES FOR ALL GRASS SEEDS.**

**LUCERNE AND CLOVERS ALWAYS AVAILABLE.**

**EXPERT ADVICE ON GRASSES AND CLOVERS.**



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### RIVER MURRAY PRUNING COMPETITIONS.

The annual River Murray Pruning Competitions, conducted under the auspices of the Agricultural Bureau, were held in the Government Orchard, Berri, on June 17th, 1931. Mr. E. Leishman (District Horticultural Instructor) acted as judge, and was assisted by Messrs. C. Smith (Renmark) and L. Chapple (Berri). The following tables set out the awards:—

#### *Fruit Trees.*

|                                    | Apricot.<br>100 | Pear.<br>100 | Peach.<br>100 | Total.<br>300 |
|------------------------------------|-----------------|--------------|---------------|---------------|
| F. G. Fox, Berri . . . . .         | 88              | 91           | 93            | 272           |
| R. Isaacson, Waikerie . . . . .    | 89              | 89           | 89            | 267           |
| A. Wedd, Mypolonga . . . . .       | 90              | 82           | 93            | 265           |
| M. Pethick, Renmark . . . . .      | 84              | 89           | 92            | 265           |
| E. A. Liddicoat, Moorook . . . . . | 86              | 90           | 88            | 264           |
| J. Virgo, Waikerie . . . . .       | 90              | 87           | 85            | 262           |
| L. Andrews, Waikerie . . . . .     | 86              | 88           | 87            | 261           |
| W. Harris, Berri . . . . .         | 84              | 85           | 89            | 258           |
| E. A. Milde, Mypolonga . . . . .   | 84              | 86           | 86            | 256           |
| E. Rout, Berri . . . . .           | 86              | 82           | 83            | 251           |
| W. Vogt, Mypolonga . . . . .       | 82              | 83           | 85            | 250           |
| F. R. Battams, Moorook . . . . .   | 81              | 85           | 79            | 245           |

Mr. F. G. Fox, Berri, won the trophy presented by the Royal Agricultural and Horticultural Society for the highest score in the Fruit Tree Section.

#### *Vine Section.*

|                                    | Sultana.<br>120 | Currant.<br>100 | Gordo.<br>100 | Total.<br>320 |
|------------------------------------|-----------------|-----------------|---------------|---------------|
| J. Virgo, Waikerie . . . . .       | 104             | 88              | 84            | 276           |
| P. Andrews, Waikerie . . . . .     | 101             | 92              | 83            | 276           |
| H. M. Perkins, Berri . . . . .     | 107             | 78              | 87            | 272           |
| A. Pietch, Renmark . . . . .       | 101             | 82              | 88            | 271           |
| M. Pethick, Renmark . . . . .      | 103             | 75              | 89            | 267           |
| F. G. Fox, Berri . . . . .         | 92              | 85              | 87            | 264           |
| E. A. Liddicoat, Moorook . . . . . | 95              | 88              | 79            | 262           |
| F. R. Battams, Moorook . . . . .   | 101             | 78              | 82            | 261           |
| S. Loxton, Moorook . . . . .       | 103             | 87              | 70            | 260           |
| G. Elliot, Waikerie . . . . .      | 99              | 80              | 79            | 258           |
| A. Wedd, Mypolonga . . . . .       | 92              | 80              | 81            | 253           |
| B. Jones, Renmrk . . . . .         | 98              | 75              | 79            | 252           |
| J. G. Beckwith, Berri . . . . .    | 95              | 81              | 76            | 252           |
| A. E. Milde, Mypolonga . . . . .   | 92              | 73              | 78            | 243           |
| W. Vogt, Mypolonga . . . . .       | 92              | 72              | 72            | 236           |

As Mr. J. Virgo, Waikerie, won the cup presented by Nitrogen Fertilizers Ltd. for the highest aggregate score in both sections of the competition, the committee decided to award the Royal Agricultural Society's cup in the Vine Section to Mr. P. Andrews, Waikerie.



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RIVER MURRAY PRUNING COMPETITIONS.



Cup presented by Nitrogen Fertilisers Ltd. for the highest aggregate score in the 1931 River Murray Pruning Competitions. Won by Mr. T. Virgo, Walkerie.

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## IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., MAY, 1931.

### IMPORTS.

#### *Interstate.*

|                                    |        |
|------------------------------------|--------|
| Apples (bushels) . . . . .         | 4,339  |
| Apples, Custard (bushel) . . . . . | 1      |
| Bananas (bushels) . . . . .        | 12,691 |
| <i>Citrus—</i>                     |        |
| Grape fruit (bushel) . . . . .     | 1      |
| Lemons (bushels) . . . . .         | 10     |
| Oranges (bushels) . . . . .        | 4      |
| Passion fruit (bushels) . . . . .  | 490    |
| Pears (bushel) . . . . .           | 1      |
| Pineapples (bushels) . . . . .     | 732    |
| Tomatoes (bushels) . . . . .       | 36     |
| Peanuts (bags) . . . . .           | 115    |
| Peanuts, kernels (bags) . . . . .  | 40     |
| Cabbages (bags) . . . . .          | 8      |
| Cauliflowers (bags) . . . . .      | 2      |
| Onions (bags) . . . . .            | 2,040  |
| Potatoes (bags) . . . . .          | 2,939  |
| Bulbs (packages) . . . . .         | 41     |
| Plants (packages) . . . . .        | 44     |
| Seeds (packages) . . . . .         | 86     |
| Trees, fruit (packages) . . . . .  | 11     |
| Wine casks (number) . . . . .      | 2,286  |
| <i>Fumigated—</i>                  |        |
| Trees, fruit (packages) . . . . .  | 10     |
| Wine casks (number) . . . . .      | 13     |
| <i>Rejected—</i>                   |        |
| Apples, custard (bushel) . . . . . | 1      |
| Bananas (bushels) . . . . .        | 30     |
| Pineapples (bushels) . . . . .     | 161    |

#### *Overseas.*

#### (State Law.)

|                               |     |
|-------------------------------|-----|
| Wine casks (number) . . . . . | 666 |
| <i>Fumigated—</i>             |     |
| Wine casks (number) . . . . . | 8   |

#### *Federal Quarantine Act.*

|                          | Packages. | Lbs.       |
|--------------------------|-----------|------------|
| Seeds, &c. . . . .       | 768       | 113,258    |
| Bamboos . . . . .        | 3         | —          |
| Palmyra stalks . . . . . | 20        | —          |
| Rattans . . . . .        | 115       | —          |
| Soil . . . . .           | 8         | 1,120      |
| Timber . . . . .         | 21,840    | 46,225     |
|                          |           | Super feet |

### EXPORTS.

#### *Federal Commerce Act.*

|                               | Packages. |
|-------------------------------|-----------|
| England—Apples . . . . .      | 450       |
| India—Apples . . . . .        | 482       |
| Oranges . . . . .             | 90        |
| Grapes . . . . .              | 701       |
| New Zealand—Oranges . . . . . | 80        |
| Lemons . . . . .              | 427       |
| Grapes . . . . .              | 174       |



## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on June 24th, there being present Messrs. F. Coleman (Chairman), H. N. Wicks (Vice-Chairman), J. W. Sandford, P. H. Jones, S. Shepherd, A. L. McEwin, P. J. Baily, Professor A. J. Perkins (Director of Agriculture), W. R. Birks (Principal Roseworthy Agricultural College), and H. C. Pritchard (Secretary). Apologies were received from Mr. A. J. Cooke and Dr. A. E. V. Richardson.

**Blue Striped Wool Packs.**—The following resolution was submitted by the Blackheath Branch: "That the Advisory Board take the necessary steps to overcome the objection against color lines in wool packs." It was decided that the Secretary should ascertain from the Stockowners' Association what action had been taken in this matter.

**Young People's Employment Bureau.**—Mr. P. H. Jones was appointed to represent the Board on the Young People's Employment Bureau.

**New Branches.**—Approval was given to the formation of new Branches at Penola (Women's), Belvidere, and Macclesfield, as from August 1st, 1931, and the following gentlemen were entered as foundation members of the latter Branch:—H. Ross, J. Schmidt, E. Mountstephens, W. Whitehouse, T. Lane, J. McGrath, S. Peters, C. Yates, B. Johnson, J. O'Loughlin, F. Pfeiffer, H. McDonald, E. Stecker, L. Boothby, H. Turner, W. Lamshed, H. Rogers, H. Birks, A. Francis, F. Ball, H. Forbes, M. Williamson, J. Kenner, K. Bowen, O. and E. Kuchel.

**Life Members.**—The following names were added to the roll of Life Members of the Agricultural Bureau:—Messrs. T. Ryan (Warcowie), H. W. Nosworthy (Gumeracha), E. Leishman (Murray Bridge), W. P. Foulis (Willowie).

**Record of Services.**—The Secretary was instructed to send a letter expressing the appreciation of the Board of the services of Mr. H. W. Cornish, who has acted as Secretary of the Weavers Branch for a number of years.

**New Members.**—The following names were added to the rolls of existing Branches:—Morehard—E. T. Tilbrook; Mount Gambier—H. Kuhl; Jamestown—F. Parrington. As from August 1st.—Maltee—W. H. Klau; Kelly—P. L. Toole; Mount Barker—Messrs. Miels and Lucie; Parilla Well Women's—Mrs. C. Napper, Miss E. Pahl.

Number of members, 8,537; number of Branches, 308.

**Retirement of Members.**—The following members retire on June 30th in accordance with the constitution of the Board:—Messrs. G. Jeffrey, A. L. McEwin, J. W. Sandford, R. H. Martin, S. Shepherd, and Dr. A. E. V. Richardson, but are eligible for re-appointment by the Hon. the Minister.

**In Committee.**—Other items were taken in committee.

### **ROSEWORTHY AGRICULTURAL COLLEGE.**

## **PIGS FOR SALE**

Pure Berkshires and a few Pure Tamworths.

**PRICES—FROM TWO GUINEAS.**

Full particulars from The Principal.



## DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED, reported on July 1st, 1931:—

**BUTTER.**—The outlook for the present season is the most promising for very many years past, and the good general rains received throughout the past month will have a very beneficial effect, not only on the growing pastures, but will recoup the subsoils after the severe drain made upon them during the past few years. Production of butter is steadily improving, and shipments are going forward regularly overseas. Providing the markets continue favorable, the outlook for the dairying industry is decidedly hopeful. There was very little fluctuation in values during this month, although store and collectors' butters eased somewhat, owing to the fact that there is only a limited demand in the Commonwealth for such, and this is a line which cannot be exported with profit. Present quotations are:—Choice creamery fresh butter, in bulk, 1s. 3½d. Prints and delivery extra. Second and third grades, 1s. 1½d. (These prices are subject to the stabilisation levies.) Well-conditioned store and collectors', 9d. to 10d.

**EGGS.**—As usual at this time of the year, production is showing an increase, and values eased. The outlook for a heavy export season seems assured, and arrangements are being made for shipments to go forward towards the end of this month, which will be followed by regular consignments afterwards. As all the States of the Commonwealth are anticipating a very heavy surplus, the only outlet is to London; but values will have to recede considerably before shipments are payable, as London market is considerably easier than last year. Present prices are:—Ordinary country eggs, fresh hen, 9d. per dozen; duck, 10d. per dozen; selected, tested, and infertile, higher.

**CHEESE.**—The supplies of cheese from the South-East have only been small throughout the month, but this is usual during the cold period of the year, and a large increase in production cannot be looked for for a month or two yet. Rates are steady. New makes, large to loaf, 8½d. to 8¾d. per lb.; semi-matured and matured, 10d. to 11d. per lb.

**ALMONDS.**—Supplies of almonds sent in have been fairly extensive, but a good steady demand was experienced throughout, both local and interstate purchasers operating. The call for kernels has been exceptionally brisk, and rates firmed, present quotations being:—Brandis, 7d. to 7½d.; mixed softshells, 6d. to 6½d.; hardshells, 3½d. to 3¾d.; kernels, 1s. 8d. per lb.

**HONEY.**—Steady sale for prime quality honey continued throughout the month under review, but lower grades were again neglected. Sales to Western Australia were prevented because of the regulations there in connection with "foul brood," and orders had to be turned down because of this. Rates are steady. Prime clear extracted, in liquid condition, 3½d. to 3¾d.; best quality candied lots, 2½d. to 3½d.; second grade, 1½d. to 2d. per lb.

**BEEFWAX.**—In moderate supplies. Demand steady; 1s. 2d. to 1s. 2½d. per lb., according to sample.

**BACON.**—Considering the lower purchasing power of the people generally, the demand for bacon kept up well. This is accounted for largely by the fact that prices are quite reasonable, as compared with other meats. Ample supplies were marketed each week by the factories, so that there was no need for importations from the other States. Best local sides, 9d. to 9½d.; best local factory cured middles, 9d. to 9½d.; large, 8½d.; local rolls, 8d. to 8½d.; Geo. Farmer's "Sugar Cane" brand hams, 1s. 1d.; local hams, 10d. to 10½d.; cooked, 1s. to 1s. 1d.; "Sugar Cane" brand lard, in packets 11d., in bulk 10d., per lb.; local prints, 9d. per lb.

**LIVE POULTRY.**—The catalogues of live poultry submitted throughout the month were again fairly representative, but poulterers regularly attended the sales and purchased freely. Good clearances were effected from week to week, but the quality of many of the birds submitted were only light to medium breeds, and the really first-class stock have been somewhat short of requirements. Prime roosters, 3s. to 4s. 1d.; extra heavy roosters to 4s. 6d.; nice-conditioned cockerels, 2s. 6d. to 2s. 11d.; fair-conditioned cockerels, 2s. to 2s. 5d.; chickens lower; heavyweight hens, 2s. 9d. to 4s.; medium hens, 2s. 3d. to 2s. 8d.; light hens, 1s. 8d. to 2s. 2d.; couple of pens of weedy sorts lower. Geese, 3s. 6d. to 5s.; prime young Muscovy drakes, 3s. 3d. to 4s. 6d.; Muscovy ducks, 2s. 3d. to 3s.; ordinary ducks, 1s. 9d. to 2s. 2d.; ducklings lower. Turkeys, good to prime condition, 8d. to 9½d. per lb., live weight; turkeys, fair condition, 6½d. to 7½d. per lb., live weight; turkeys, fattening sorts, lower. Pigeons, 4d. to 6d. each.

**POTATOES.**—Local, 4s. to 4s. 6d. per cwt.

**ONIONS.**—Brown, 5s. 6d. to 6s. per cwt.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month and to the end of June, 1931, also the average precipitation to the end of June and the average annual rainfall.

| Station.                   | For June, 1931. | To end June. | Av'ge to end June. | Av'ge Annual Rain-fall. | Station.               | For June, 1931. | To end June. | Av'ge to end June. | Av'ge Annual Rain-fall. |
|----------------------------|-----------------|--------------|--------------------|-------------------------|------------------------|-----------------|--------------|--------------------|-------------------------|
| FAR NORTH AND UPPER NORTH. |                 |              |                    |                         | LOWER NORTH—continued. |                 |              |                    |                         |
| Oodnadatta .....           | 1.46            | 2.44         | 2.78               | 4.72                    | Brinkworth ....        | 3.17            | 8.65         | 6.89               | 15.85                   |
| Marree .....               | 0.83            | 3.57         | 3.14               | 5.86                    | Blyth .....            | 3.18            | 9.13         | 7.62               | 16.96                   |
| Farina .....               | 0.80            | 4.82         | 3.67               | 6.46                    | Clare .....            | 4.10            | 11.86        | 10.93              | 24.61                   |
| Copley .....               | 1.34            | 5.53         | 4.44               | 7.93                    | Mintaro .....          | 4.45            | 12.55        | 9.84               | 23.43                   |
| Beltana .....              | 1.00            | 4.42         | 4.65               | 8.59                    | Watervale .....        | 4.36            | 12.41        | 11.93              | 27.10                   |
| Blinman .....              | 1.86            | 6.00         | 7.28               | 12.02                   | Auburn .....           | 3.51            | 10.95        | 10.64              | 24.08                   |
| Hookina .....              | 3.42            | 9.15         | 5.54               | 11.51                   | Hoyleton .....         | 3.07            | 8.00         | 7.77               | 17.44                   |
| Hawker .....               | 3.12            | 11.57        | 5.89               | 12.28                   | Balaklava .....        | 1.81            | 5.64         | 7.15               | 15.61                   |
| Wilson .....               | 2.53            | 9.10         | 5.71               | 11.84                   | Port Wakefield ..      | 1.29            | 4.58         | 6.48               | 13.04                   |
| Gordon .....               | 1.74            | 6.68         | 5.21               | 10.73                   | Terowie .....          | 1.63            | 5.18         | 5.87               | 13.47                   |
| Quorn .....                | 2.25            | 6.92         | 6.07               | 13.42                   | Yarcowie .....         | 1.40            | 4.77         | 6.17               | 13.72                   |
| Port Augusta ....          | 2.41            | 7.70         | 4.76               | 9.43                    | Hallett .....          | 2.47            | 6.49         | 7.02               | 16.47                   |
| Bruce .....                | 1.86            | 6.55         | 4.53               | 9.94                    | Mount Bryan ..         | 2.45            | 6.56         | 7.05               | 16.79                   |
| Hammond .....              | 2.00            | 6.28         | 5.26               | 11.41                   | Koorunga .....         | 2.94            | 7.63         | 7.94               | 17.96                   |
| Wilmington .....           | 3.25            | 8.36         | 8.03               | 17.63                   | Farrell's Flat ..      | 3.28            | 9.20         | 8.21               | 18.75                   |
| Willowie .....             | 3.40            | 8.00         | 5.51               | 12.11                   | WEST OF MURRAY RANGE.  |                 |              |                    |                         |
| Melrose .....              | 4.07            | 10.27        | 10.61              | 23.01                   | Manoora .....          | 2.68            | 8.91         | 8.00               | 18.94                   |
| Booleroo Centre...         | 2.71            | 7.49         | 6.95               | 15.26                   | Saddleworth ....       | 2.63            | 8.52         | 8.77               | 19.60                   |
| Port Germein ....          | 2.53            | 6.48         | 5.95               | 12.47                   | Marrabel .....         | 2.74            | 9.25         | 8.66               | 19.87                   |
| Wirrabara .....            | 2.99            | 7.08         | 8.55               | 19.34                   | Riverton .....         | 2.74            | 9.68         | 9.26               | 20.81                   |
| Appila .....               | 2.40            | 5.47         | 6.66               | 14.69                   | Tarlee .....           | 2.33            | 8.11         | 8.10               | 18.13                   |
| Craddock .....             | 1.64            | 6.73         | 5.27               | 10.87                   | Stockport .....        | 2.82            | 8.68         | 7.45               | 16.81                   |
| Carrieton .....            | 2.21            | 6.77         | 5.68               | 12.40                   | Hamley Bridge ..       | 2.27            | 6.84         | 7.56               | 16.60                   |
| Johnburg .....             | 1.96            | 5.98         | 4.81               | 10.64                   | Kapunda .....          | 2.18            | 8.50         | 8.83               | 19.85                   |
| Eurelia .....              | 2.03            | 6.38         | 6.01               | 13.06                   | Freeling .....         | 2.05            | 7.94         | 7.93               | 17.95                   |
| Orroroo .....              | 2.64            | 6.93         | 6.29               | 13.28                   | Greenock .....         | 2.61            | 8.70         | 9.37               | 21.68                   |
| Nackara .....              | 1.71            | 5.09         | 5.73               | 11.16                   | Truro .....            | 2.79            | 8.13         | 8.77               | 20.09                   |
| Black Rock .....           | 2.45            | 6.20         | 5.80               | 12.50                   | Stockwell .....        | 2.95            | 8.48         | 8.83               | 20.18                   |
| Oodlawirra .....           | 2.12            | 6.42         | —                  | —                       | Nuriootpa .....        | 3.27            | 10.23        | 9.04               | 20.65                   |
| Peterborough ....          | 2.45            | 6.61         | 6.03               | 13.30                   | Angaston .....         | 3.48            | 10.30        | 9.86               | 22.49                   |
| Yongala .....              | 2.88            | 7.36         | 6.31               | 14.46                   | Tanunda .....          | 3.33            | 8.69         | 9.97               | 22.12                   |
| NORTH-EAST.                |                 |              |                    |                         | Lyndoch .....          | 4.24            | 10.05        | 10.13              | 23.58                   |
| Yunta .....                | 2.41            | 7.20         | 4.27               | 8.46                    | Williamstown...        | 7.13            | 14.43        | 12.45              | 27.71                   |
| Waukarina .....            | 1.62            | 5.91         | 4.03               | 8.06                    | ADELAIDE PLAINS.       |                 |              |                    |                         |
| Mannahill .....            | 1.17            | 4.81         | 4.19               | 8.31                    | Owen .....             | 2.12            | 7.26         | 5.93               | 13.91                   |
| Cockburn .....             | 1.47            | 8.37         | 4.16               | 7.93                    | Mallala .....          | 2.71            | 7.12         | 7.69               | 16.67                   |
| Broken Hill, N.S.W.        | 1.78            | 9.25         | 4.99               | 9.61                    | Roseworthy .....       | 2.35            | 8.63         | 7.81               | 17.38                   |
| LOWER NORTH.               |                 |              |                    |                         | Gawler .....           | 2.64            | 8.45         | 8.84               | 19.06                   |
| Port Pirie .....           | 3.19            | 7.16         | 6.42               | 13.25                   | Two Wells .....        | 2.51            | 7.03         | 7.61               | 15.81                   |
| Port Broughton ..          | 2.78            | 7.52         | 6.64               | 14.02                   | Virginia .....         | 2.86            | 8.02         | 8.10               | 17.23                   |
| Bute .....                 | 3.78            | 7.60         | 7.09               | 15.48                   | Smithfield .....       | 3.36            | 9.99         | 8.03               | 17.51                   |
| Laura .....                | 2.59            | 6.61         | 7.97               | 18.11                   | Salisbury .....        | 3.44            | 8.48         | 8.83               | 18.60                   |
| Caltowie .....             | 2.75            | 6.66         | 7.35               | 16.85                   | Adelaide .....         | 5.46            | 11.61        | 10.00              | 21.12                   |
| Jamestown .....            | 2.78            | 7.12         | 7.61               | 17.84                   | Glen Osmond ..         | 6.46            | 13.38        | 12.13              | 26.06                   |
| Gladstone .....            | 2.78            | 7.20         | 7.14               | 16.40                   | Magill .....           | 6.12            | 13.18        | 12.01              | 25.61                   |
| Crystal Brook ....         | 3.30            | 7.47         | 7.16               | 15.87                   | MOUNT LOFTY RANGES.    |                 |              |                    |                         |
| Georgetown .....           | 3.43            | 8.28         | 8.27               | 18.47                   | Tentree Gully ...      | 5.46            | 13.10        | 12.78              | 27.53                   |
| Narridy .....              | 3.19            | 7.36         | 7.27               | 15.93                   | Stirling West ..       | 12.57           | 26.82        | 21.53              | 46.90                   |
| Redhill .....              | 3.62            | 8.07         | 7.55               | 16.63                   | Uraidla .....          | 10.41           | 21.89        | 20.28              | 44.11                   |
| Spalding .....             | 2.58            | 7.24         | 7.99               | 19.34                   | Clarendon .....        | 8.51            | 17.03        | 15.33              | 32.91                   |
| Guinane .....              | 3.13            | 9.07         | 7.89               | 18.74                   | Morphett Vale ..       | 6.51            | 13.49        | 10.51              | 22.69                   |
| Yacka .....                | 2.48            | 7.63         | 6.89               | 15.35                   | Noarlunga .....        | 4.95            | 10.92        | 9.57               | 20.40                   |
| Koolunga .....             | 2.57            | 6.99         | 6.90               | 15.52                   | Willunga .....         | 6.38            | 15.58        | 12.13              | 26.02                   |
| Snawtown .....             | 3.70            | 9.16         | 7.13               | 15.70                   | Aldinga .....          | 4.91            | 12.20        | 9.52               | 20.25                   |



## RAINFALL—continued.

| Station.                  | For June, 1931. | To end June. | Av'ge to end June. | Av'ge Annual Rain-fall. | Station.                      | For June, 1931. | To end June. | Av'ge to end June. | Av'ge Annual Rain-fall. |
|---------------------------|-----------------|--------------|--------------------|-------------------------|-------------------------------|-----------------|--------------|--------------------|-------------------------|
| MOUNT LOFTY RANGES—contd. |                 |              |                    |                         | WEST OF SPENCER'S GULF—contd. |                 |              |                    |                         |
| Myponga .....             | 9-31            | 18-61        | 12-97              | 29-14                   | Rudall .....                  | 1-90            | 5-21         | 5-24               | *12-07                  |
| Normanville .....         | 5-10            | 10-81        | 9-75               | 20-73                   | Cleve .....                   | 1-81            | 8-12         | 6-68               | 14-61                   |
| Yankalilla .....          | 6-78            | 13-65        | 10-98              | 22-95                   | Cowell .....                  | 1-01            | 3-79         | 5-47               | 11-16                   |
| Mount Pleasant ..         | 5-26            | 12-08        | 11-99              | 27-29                   | Miltalie .....                | 1-84            | 6-60         | 5-90               | 13-59                   |
| Birdwood .....            | 6-06            | 12-79        | 12-80              | 29-28                   | Darke's Peak ..               | 2-99            | 7-89         | 6-35               | 14-98                   |
| Gumeracha .....           | 6-57            | 15-08        | 14-99              | 33-45                   | Kimba .....                   | 2-52            | 6-80         | 5-22               | *11-50                  |
| Millbrook Reservoir       | 6-74            | 15-98        | 15-08              | 35-55                   |                               |                 |              |                    |                         |
| Tweedvale .....           | 8-73            | 17-42        | 15-84              | 35-96                   | YORKE PENINSULA.              |                 |              |                    |                         |
| Woodside .....            | 7-79            | 15-96        | 14-10              | 32-38                   | Walleroo .....                | 3-21            | 7-41         | 7-00               | 13-94                   |
| Ambleside .....           | 7-40            | 15-60        | 15-28              | 35-02                   | Kadina .....                  | 3-13            | 7-29         | 7-57               | 15-71                   |
| Nairne .....              | 4-28            | 11-59        | 12-54              | 28-22                   | Moonta .....                  | 2-79            | 7-22         | 7-47               | 15-10                   |
| Mount Barker ....         | 6-84            | 16-17        | 13-91              | 31-71                   | Paskeville .....              | 3-06            | 6-19         | 7-18               | 15-64                   |
| Echunga .....             | 6-52            | 15-08        | 15-25              | 33-29                   | Maitland .....                | 4-36            | 9-03         | 9-42               | 19-97                   |
| Macclesfield .....        | 5-00            | 14-35        | 13-33              | 30-62                   | Ardrossan .....               | 1-89            | 6-36         | 6-59               | 14-00                   |
| Meadows .....             | 7-68            | 17-49        | 16-16              | 36-34                   | Port Victoria ..              | 3-11            | 7-81         | 7-32               | 15-44                   |
| Strathalbyn .....         | 2-71            | 8-38         | 8-68               | 19-43                   | Curramulka ....               | 3-35            | 8-74         | 8-09               | 17-92                   |
| MURRAY FLATS AND VALLEY.  |                 |              |                    |                         | Minlaton .....                | 2-96            | 7-92         | 8-24               | 17-90                   |
| Meningie .....            | 3-04            | 7-37         | 8-62               | 18-46                   | Port Vincent ...              | 1-88            | 5-61         | 6-53               | 14-56                   |
| Milang .....              | 1-89            | 6-34         | 7-05               | 15-05                   | Brentwood ....                | 3-12            | 7-50         | 6-96               | 15-52                   |
| Langhorne's Creek         | 1-72            | 6-40         | 6-68               | 14-80                   | Stansbury .....               | 2-19            | 7-16         | 7-69               | 16-89                   |
| Wellington .....          | 2-06            | 7-20         | 6-83               | 14-64                   | Warooka .....                 | 3-64            | 8-28         | 8-03               | 17-60                   |
| Tailem Bend .....         | 2-53            | 9-10         | 7-40               | 14-66                   | Yorketown .....               | 2-31            | 7-96         | 7-76               | 16-98                   |
| Murray Bridge ...         | 1-29            | 5-02         | 6-31               | 13-76                   | Edithburgh ....               | 2-15            | 6-67         | 7-64               | 16-44                   |
| Callington .....          | 1-38            | 5-55         | 6-83               | 15-31                   | SOUTH AND SOUTH-EAST.         |                 |              |                    |                         |
| Mannum .....              | 1-00            | 5-05         | 5-52               | 11-53                   | Cape Borda ....               | 8-04            | 14-37        | 11-76              | 24-76                   |
| Palmer .....              | 1-91            | 5-50         | 6-47               | 15-55                   | Kingscote .....               | 4-09            | 8-92         | 8-78               | 19-05                   |
| Sedan .....               | 1-45            | 4-74         | 5-64               | 12-16                   | Penneshaw .....               | 3-72            | 10-99        | 7-90               | 18-65                   |
| Swan Reach .....          | 1-34            | 5-84         | 4-85               | 10-65                   | Victor Harbor ..              | 3-33            | 10-03        | 9-80               | 21-33                   |
| Blanchetown .....         | 1-62            | 5-11         | 5-59               | 11-14                   | Port Elliot .....             | 2-36            | 8-07         | 9-25               | 20-02                   |
| Eudunda .....             | 2-04            | 8-39         | 7-56               | 17-13                   | Goolwa .....                  | 2-45            | 8-18         | 8-32               | 17-87                   |
| Sutherland .....          | 1-92            | 6-32         | 4-70               | 10-79                   | Copeville .....               | 1-79            | 6-02         | 4-89               | 11-58                   |
| Morgan .....              | 1-88            | 4-40         | 4-24               | 9-17                    | Meribah .....                 | 2-04            | 5-03         | 5-54               | *11-34                  |
| Waikerie .....            | 1-77            | 4-85         | 4-49               | 9-61                    | Alawoona .....                | 2-23            | 5-33         | 4-74               | *9-08                   |
| Overland Corner ..        | 1-58            | 3-96         | 4-99               | 10-50                   | Mindarie .....                | 2-16            | 5-76         | 4-86               | 11-88                   |
| Loxton .....              | 2-08            | 5-82         | 5-36               | 11-60                   | Sandalwood .....              | 2-70            | 7-04         | 5-91               | 13-67                   |
| Renmark .....             | 2-00            | 4-86         | 4-79               | 10-52                   | Karoonda .....                | 2-21            | 6-88         | 6-27               | 14-37                   |
| WEST OF SPENCER'S GULF.   |                 |              |                    |                         | Pinnaroo .....                | 2-90            | 7-27         | 6-57               | 14-70                   |
| Eucla .....               | 2-46            | 7-29         | 5-51               | *9-96                   | Parilla .....                 | 3-26            | 7-24         | 6-05               | 13-96                   |
| Nullarbor .....           | 1-67            | 7-91         | 4-65               | *8-62                   | Lameroo .....                 | 3-37            | 7-35         | 7-03               | 16-19                   |
| Fowler's Bay ....         | 3-92            | 11-80        | 6-03               | 11-76                   | Parrakie .....                | 3-65            | 7-54         | 6-16               | 14-52                   |
| Penong .....              | 3-59            | 14-14        | 5-80               | 11-94                   | Geranium .....                | 3-21            | 7-88         | 7-02               | 16-49                   |
| Koonibba .....            | 3-28            | 11-74        | 5-23               | *11-64                  | Peake .....                   | 2-35            | 5-93         | 7-11               | 16-30                   |
| Denial Bay .....          | 2-85            | 9-85         | 5-65               | *11-31                  | Cooke's Plains ..             | 2-05            | 6-16         | 6-87               | 15-47                   |
| Ceduna .....              | 2-77            | 9-10         | 4-54               | 9-82                    | Coomandook .....              | 2-50            | 7-12         | 7-52               | 17-34                   |
| Smoky Bay .....           | 3-08            | 7-16         | 4-78               | 10-44                   | Coonalpyn .....               | 3-04            | 8-46         | 7-70               | 17-51                   |
| Wirrulla .....            | 3-16            | 8-35         | —                  | —                       | Tintinara .....               | 3-28            | 7-93         | 8-28               | 18-81                   |
| Streaky Bay .....         | 3-66            | 8-67         | 7-17               | 14-91                   | Keith .....                   | 2-83            | 7-81         | 7-85               | 17-93                   |
| Chandada .....            | 3-35            | 8-08         | —                  | —                       | Bordertown .....              | 2-61            | 6-84         | 8-54               | 19-35                   |
| Minnipa .....             | 3-46            | 9-11         | 6-19               | 13-73                   | Wolsley .....                 | 3-12            | 8-24         | 8-04               | 18-41                   |
| Kyancutta .....           | 2-79            | 7-22         | —                  | —                       | Frances .....                 | 3-20            | 8-35         | 8-50               | 19-94                   |
| Talia .....               | 4-50            | 9-45         | 6-23               | 14-76                   | Naracoorte .....              | 3-07            | 10-79        | 9-93               | 22-58                   |
| Port Elliston .....       | 4-05            | 10-10        | 7-66               | 16-47                   | Penola .....                  | 3-40            | 11-32        | 11-50              | 26-15                   |
| Yeelanna .....            | 2-78            | 6-66         | 6-55               | 16-03                   | Lucindale .....               | 4-49            | 12-33        | 10-16              | 23-07                   |
| Cummins .....             | 2-98            | 6-46         | 7-26               | 17-77                   | Kingston .....                | 4-82            | 14-14        | 11-28              | 24-37                   |
| Port Lincoln .....        | 2-84            | 7-62         | 8-84               | 19-45                   | Robe .....                    | 4-94            | 13-26        | 11-39              | 24-61                   |
| Tumby .....               | 2-06            | 5-20         | 5-76               | 14-14                   | Beachport .....               | 5-32            | 13-49        | 12-74              | 26-97                   |
| Ungarra .....             | 2-95            | —            | 6-73               | 16-83                   | Millicent .....               | 5-42            | 14-92        | 13-74              | 29-79                   |
| Carrow .....              | 1-73            | 6-49         | 5-42               | 13-38                   | Kalangadoo .....              | 4-41            | 14-18        | 13-76              | 32-34                   |
| Arno Bay .....            | 1-97            | 6-10         | 5-60               | 12-46                   | Mount Gambier ..              | 3-55            | 12-12        | 13-65              | 30-74                   |

\* Denotes average for less than 10-year period—Oodlawirra (1 year), Koonibba (—), Rudall (5), Meribah (9), Owen (5), Denial Bay (9), Kimba (9), Alawoona (8), Eucla (1), Wirrulla (1).



## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

| Branch.            | Report on Page. | Dates of Meetings. |      | Branch.                    | Report on Page. | Dates of Meetings. |      |
|--------------------|-----------------|--------------------|------|----------------------------|-----------------|--------------------|------|
|                    |                 | July.              | Aug. |                            |                 | July.              | Aug. |
| Alawoona.          | †               | —                  | —    | Eudunda.                   | †               | 6                  | 3    |
| Aldinga.           | †               | —                  | —    | Eurelia.                   | †               | 11                 | 8    |
| Allandale East.    | †               | 24                 | 28   | Eurelia Women's.           | †               | 1                  | 5    |
| Alma.              | •               | —                  | —    | Everard East.              | •               | —                  | —    |
| Amyton.            | •               | —                  | —    | Farrell's Flat.            | •               | 81                 | 28   |
| Angaston.          | •               | —                  | —    | Finniss.                   | •               | —                  | —    |
| Appila.            | 1316            | —                  | —    | Gawler River.              | •               | —                  | —    |
| Appila-Yarrowie.   | †               | 3                  | 7    | Georgetown.                | •               | 25                 | 22   |
| Arthurs.           | †               | 22                 | 26   | Geranium.                  | •               | 25                 | 29   |
| Ashbourne.         | †               | —                  | —    | Gladstone.                 | †               | 24                 | 28   |
| Auburn.            | †               | R                  | —    | Gladstone Women's.         | •               | 10                 | 14   |
| Auburn Women's.    | †               | —                  | —    | Glencoe.                   | †               | 14                 | 11   |
| Balaklava.         | †               | —                  | —    | Glossop.                   | †               | 29                 | 26   |
| Balham.            | †               | —                  | —    | Goode.                     | †               | 29                 | 26   |
| Barmera.           | •               | 27                 | 24   | Goode Women's.             | †               | 6                  | —    |
| Beetaloo Valley.   | •               | R                  | R    | Greenock.                  | 1325            | 23                 | 27   |
| Belalie North.     | •               | 2                  | 11   | Green Patch.               | •               | —                  | —    |
| Belalie Women's.   | 1309            | 29                 | 26   | Gulnare.                   | •               | 27                 | 31   |
| Berri.             | †               | —                  | —    | Gumeracha.                 | •               | —                  | —    |
| Big Swamp.         | †               | 30                 | —    | Halidon.                   | •               | —                  | —    |
| Blackheath.        | †               | —                  | —    | Hanson.                    | †               | —                  | —    |
| Black Rock.        | •               | 28                 | 25   | Hartley.                   | †               | 30                 | 25   |
| Black Springs.     | •               | 13                 | 10   | Hawker.                    | •               | —                  | —    |
| Blackwood.         | •               | —                  | —    | Hookina.                   | •               | 20                 | 17   |
| Block E.           | •               | 17                 | 21   | Hoyleton.                  | †               | 16                 | 20   |
| Blyth.             | •               | 24                 | 28   | Inman Valley.              | †               | —                  | —    |
| Boaleroo Centre.   | †               | —                  | —    | Ironbank.                  | †               | 15                 | 19   |
| Boolgun.           | †               | 2 & 25             | 6    | Jamestown.                 | †               | —                  | 13   |
| Boor's Plains.     | †               | —                  | —    | Jervols.                   | †               | 11                 | 8    |
| Borrika.           | †               | —                  | 24   | Kalangadoo Women's.        | †               | 14                 | 11   |
| Bowhill.           | 1323            | 2                  | 6    | Kalangadoo.                | †               | 15                 | 19   |
| Brentwood.         | †               | 29                 | 26   | Kalyan.                    | †               | —                  | —    |
| Brinkley.          | †               | 27                 | 24   | Kangarilla.                | †               | 16                 | 20   |
| Brinkworth.        | †               | 1 & 29             | 26   | Kangarilla Women's.        | •               | —                  | —    |
| Brownlow.          | •               | —                  | —    | Kannantoo.                 | •               | —                  | —    |
| Buchanan.          | 1319            | 14                 | 11   | Kanni.                     | †               | —                  | —    |
| Bugle.             | •               | —                  | —    | Kapinnie.                  | †               | 10                 | 14   |
| Bundaleer Springs. | •               | —                  | —    | Kapunda.                   | •               | —                  | —    |
| Bunora.            | •               | 29                 | 28   | Karcultaby.                | •               | —                  | —    |
| Bute.              | •               | 16                 | 20   | Karoonda.                  | •               | 29                 | 26   |
| Butler.            | •               | —                  | —    | Keth.                      | •               | 23                 | 27   |
| Calca.             | •               | —                  | —    | Kelly.                     | †               | 25                 | 1    |
| Cadell.            | •               | 7                  | 4    | Ki Ki.                     | •               | —                  | —    |
| Calph.             | •               | —                  | —    | Kilkerran.                 | 1322            | —                  | 4    |
| Caltowie.          | 1318            | —                  | —    | Kongorong.                 | •               | 27                 | 24   |
| Canowie Belt.      | •               | 22                 | 26   | Koolunga.                  | 1317            | —                  | —    |
| Caraluc.           | •               | 29                 | 26   | Koonibba.                  | •               | 23                 | 27   |
| Carrow.            | •               | —                  | —    | Koonunga.                  | •               | —                  | —    |
| Chandada.          | •               | —                  | —    | Koppio.                    | 1327            | 27                 | 24   |
| Charra.            | •               | —                  | —    | Kringin.                   | •               | 27                 | 31   |
| Cherry Gardens.    | 1331            | —                  | —    | Kulkawirra.                | 1328            | 14                 | 11   |
| Clanfield.         | †               | 7                  | 4    | Kyancutta.                 | •               | 7                  | 4    |
| Clare.             | •               | 27                 | 24   | Kybybolite.                | •               | 23                 | 27   |
| Clarendon.         | •               | 2                  | 6    | Lameroo.                   | •               | 25                 | 22   |
| Cleve.             | •               | —                  | —    | Langhorne's Creek.         | †               | 22                 | 26   |
| Cobdogla.          | •               | 1                  | 5    | Laura.                     | †               | 25                 | 29   |
| Collie.            | •               | —                  | —    | Laura Bay.                 | •               | —                  | —    |
| Colton.            | •               | 31                 | 28   | Lenswood and Forest Range. | 1331            | 27                 | —    |
| Coomandook.        | •               | —                  | —    | Light's Pass.              | †               | —                  | —    |
| Coonalpyn.         | •               | 30                 | 27   | Ipsen.                     | •               | 25                 | 22   |
| Coonawarra.        | •               | —                  | —    | Lone Gum and Monash.       | •               | 29                 | 26   |
| Coorabie.          | •               | —                  | —    | Lone Pine.                 | •               | —                  | —    |
| Copeville.         | •               | —                  | —    | Longwood.                  | 1331            | —                  | —    |
| Couta.             | •               | —                  | —    | Lowbank.                   | •               | 29                 | 28   |
| Cradock.           | •               | 10                 | 14   | Loxton.                    | •               | 10                 | 14   |
| Cummins.           | •               | —                  | —    | Lucindale.                 | •               | —                  | —    |
| Cungena.           | †               | 2                  | 6    | Lyndoch.                   | •               | 28                 | 25   |
| Currency Creek.    | •               | 27                 | 31   | McLaren Flat.              | †               | 28                 | 25   |
| Cygnets River.     | •               | —                  | —    | MacGillivray.              | •               | 20                 | 17   |
| Darke's Peak.      | •               | —                  | —    | Mallala.                   | †               | 23                 | 27   |
| Dudley.            | •               | —                  | —    | Maltee.                    | •               | —                  | —    |
| Edithvale.         | •               | —                  | —    | Mangalo.                   | •               | —                  | —    |
| Edithvale.         | •               | —                  | —    | Mannanarie.                | •               | —                  | —    |
| Elbow Hill.        | 1325            | 28                 | 25   | Marana.                    | †               | —                  | —    |



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|                            |                 | July.              | Aug. |                              |                 | July.              | Aug. |
| Meadows .....              | *               | 29                 | 26   | Rosedale .....               | *               | —                  | —    |
| Meribah .....              | *               | 13                 | 10   | Roseworthy .....             | *               | —                  | —    |
| Millang .....              | *               | 11                 | 8    | Roxy Pine .....              | *               | —                  | —    |
| Millindilla .....          | 1828            | 23                 | 27   | Rudall .....                 | *               | 28                 | 25   |
| Millieent .....            | *               | 31                 | 28   | Saddleworth .....            | 1821            | 31                 | 28   |
| Millieent Women's .....    | 1809            | 17                 | 27   | Saddleworth Women's .....    | *               | 7                  | 4    |
| Miltalie .....             | †               | 25                 | —    | Salisbury .....              | *               | 14                 | 11   |
| Mindarie .....             | †               | 3                  | 7    | Salt Creek .....             | *               | —                  | —    |
| Minnipa .....              | *               | —                  | —    | Sandalwood .....             | *               | —                  | —    |
| Modbury .....              | *               | —                  | —    | Scott's Bottom .....         | †               | 25                 | 22   |
| Mogarto South .....        | 1828            | —                  | —    | Shoal Bay .....              | *               | 28                 | 25   |
| Moonta .....               | *               | —                  | —    | Smoky Bay .....              | †               | —                  | —    |
| Moorlands .....            | *               | R                  | 26   | Snowtown .....               | †               | 10                 | 14   |
| Moorook .....              | *               | —                  | —    | South Kilkerran .....        | †               | 28                 | 25   |
| Morchar .....              | 1817            | 24                 | 28   | Spalding .....               | *               | —                  | —    |
| Morphett Vale .....        | *               | 29                 | 26   | Springton .....              | †               | 1                  | 5    |
| Mount Barker .....         | *               | —                  | —    | Stirling .....               | *               | —                  | —    |
| Mount Bryan .....          | *               | —                  | —    | Stockport .....              | *               | —                  | —    |
| Mount Compass .....        | †               | 10                 | 14   | Strathalbyn .....            | *               | 24                 | 23   |
| Mount Gambler .....        | *               | 28                 | 25   | Streaky Bay .....            | *               | 39                 | —    |
| Mount Hope .....           | †               | —                  | —    | Tallem Bend .....            | *               | 31                 | 23   |
| Mount Pleasant .....       | †               | —                  | —    | Talla .....                  | 1815            | 4                  | 1    |
| Mount Remarkable .....     | *               | —                  | —    | Tantanoola .....             | *               | 28                 | 25   |
| Mount Schank .....         | *               | —                  | —    | Tapian .....                 | †               | 23                 | 27   |
| Mudamuckla .....           | †               | 11                 | 8    | Taragoro .....               | †               | —                  | —    |
| Mundalla .....             | †               | 30                 | 27   | Tarcowie .....               | *               | —                  | —    |
| Murray Bridge .....        | *               | —                  | —    | Tarlee .....                 | *               | —                  | —    |
| Murraytown .....           | †               | 27                 | 26   | Tatlar .....                 | *               | —                  | —    |
| Mypolonga .....            | *               | —                  | —    | Thrington .....              | *               | —                  | —    |
| Myra .....                 | *               | 29                 | 26   | Tintinara .....              | *               | —                  | —    |
| Nantawarra .....           | 1819            | 23                 | 27   | Truro .....                  | †               | 13                 | 10   |
| Naracoorte .....           | *               | 11                 | 8    | Tulkinara .....              | †               | 30                 | 27   |
| Narridy .....              | *               | 4                  | —    | Tweedvale .....              | *               | 30                 | 27   |
| Narrung .....              | *               | —                  | —    | Two Wells .....              | *               | —                  | —    |
| Nelshaby .....             | *               | —                  | —    | Ungarra .....                | *               | 30                 | —    |
| Nelshaby Women's .....     | *               | —                  | —    | Upper Wakefield .....        | 1821            | —                  | —    |
| Netherton .....            | 1829            | 29                 | 26   | Uraidla and Summertown ..... | *               | 6                  | 3    |
| New Residence .....        | *               | —                  | —    | Vetch .....                  | *               | —                  | —    |
| North Booborowie .....     | *               | 27                 | 24   | Virginia .....               | 1822            | —                  | —    |
| Nunilkompita .....         | †               | 23                 | 27   | Waddakee Rocks .....         | †               | —                  | 22   |
| Nunkeri .....              | †               | 22                 | 26   | Walkerie .....               | †               | 10                 | 14   |
| O'Loughlin .....           | *               | 13                 | —    | Wallala .....                | †               | 8                  | 12   |
| Orroroo .....              | *               | —                  | —    | Wanbi .....                  | *               | 22                 | 26   |
| Overland Corner .....      | 1829            | 28                 | 25   | Wandearah .....              | *               | 23                 | 25   |
| Owen .....                 | 1820            | 24                 | 23   | Warcoole .....               | †               | 28                 | 25   |
| Palable .....              | †               | —                  | —    | Warcoole Women's .....       | 1811            | —                  | —    |
| Parilla .....              | *               | —                  | —    | Warrambo .....               | †               | 23                 | 25   |
| Parilla Women's .....      | 1810            | 17                 | 19   | Wasleys .....                | 1811            | 19                 | 13   |
| Parilla Well .....         | *               | 21                 | 18   | Wasleys Women's .....        | †               | 2                  | 6    |
| Parilla Well Women's ..... | †               | 21                 | 18   | Watervale .....              | *               | —                  | —    |
| Parrakie .....             | *               | —                  | —    | Wauratie .....               | *               | 23                 | 25   |
| Parrakie Women's .....     | 1811            | 28                 | 25   | Weavers .....                | †               | 13                 | 10   |
| Paruna .....               | †               | 3                  | 7    | Wepowie .....                | †               | 27                 | 24   |
| Peakeville .....           | *               | 28                 | 25   | White's River .....          | †               | 14                 | 11   |
| Pata .....                 | *               | 3                  | 7    | Whyte-Yarcowie .....         | *               | —                  | —    |
| Penneshaw .....            | *               | —                  | —    | Wilkawatt Women's .....      | *               | 21                 | 18   |
| Penola .....               | †               | 4                  | 1    | Williamstown Women's .....   | †               | 1                  | 5    |
| Penwortham .....           | 1820            | 23                 | 27   | Williamstown .....           | *               | —                  | —    |
| Petersville .....          | 1825            | 28                 | 25   | Willowie .....               | †               | 27                 | 24   |
| Petina .....               | †               | 25                 | 22   | Wilmington .....             | †               | 21                 | 18   |
| Pinbong .....              | *               | —                  | —    | Windsor .....                | †               | —                  | —    |
| Pinkawillie .....          | *               | —                  | —    | Wirrabara .....              | †               | —                  | —    |
| Pinnaroo .....             | †               | —                  | —    | Wirrilla .....               | *               | 25                 | 22   |
| Pinnaroo Women's .....     | †               | 3                  | 7    | Wirrilla Women's .....       | *               | R                  | R    |
| Poochera .....             | †               | —                  | —    | Wirrulla .....               | *               | 15                 | 19   |
| Port Elliot .....          | †               | —                  | —    | Wolseley .....               | †               | 13                 | 10   |
| Pygery .....               | †               | 28                 | 25   | Wudinna .....                | †               | —                  | —    |
| Quorn .....                | *               | —                  | —    | Wynarka .....                | *               | —                  | —    |
| Ranco .....                | 1830            | 27                 | 24   | Yacka .....                  | *               | —                  | —    |
| Rapid Bay .....            | *               | 9                  | 13   | Yadnarie .....               | 1827            | 28                 | 25   |
| Redhill .....              | †               | —                  | —    | Yallunda Flat .....          | *               | —                  | —    |
| Rendelsham .....           | 1814            | 28                 | 25   | Yandiah .....                | †               | 10                 | 14   |
| Renmark .....              | *               | —                  | —    | Yaninee .....                | *               | —                  | —    |
| Rhyrie .....               | *               | —                  | —    | Yantanable .....             | *               | —                  | —    |
| Richman's Creek .....      | *               | 23                 | 27   | Yeelanna .....               | *               | 29                 | 26   |
| Riverton .....             | †               | 13                 | 10   | Yorketown .....              | *               | —                  | —    |
| Riverton Women's .....     | †               | —                  | —    | Youghusband .....            | †               | —                  | —    |
| Roberts and Verran .....   | †               | —                  | —    | Yurgo .....                  | †               | —                  | —    |
| Rockwood .....             | *               | 6                  | 3    |                              |                 |                    |      |

\* No report received during the month of June.

† Held over.

R In recess.



## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS. WOMEN'S BRANCHES.

#### BELALIE.

June 9th.—Present: 20 members and 26 visitors.

The meeting was devoted to a competition for the best decorated dinner table, display of work done by pupils of the dressmaking and art needlework classes, hessian work by Miss Phyllis Moore, and an exhibition of work—ancient and modern—by hand, loom, or machine. The prizes (donated by the President) for the best decorated table were won by Mrs. E. J. Swann first, and Mrs. L. R. Clarke second. There was a good display of dressmaking and art needlework, and a very interesting exhibit of old and valuable work. This included cushion covers and d'oyleys, table covers and macrame work, ancient point lace and modern wool work. It was decided to form a depot for the outback relief in connection with this Branch. Miss Mitchell read extracts from Miss Campbell's article on Hessian in the Home, and Miss P. Moore's work used for demonstration. Musical items were rendered by Miss L. Clarke and Mesdames Symonds, Price, Swann, and Clarke. (Secretary, Mrs. E. Orchard, Jamestown.)

#### MILLICENT.

May 15th.—Present: 14 members.

**ECONOMIES IN THE HOME.**—Mrs. Redman read a paper on this subject. *Mutton Flaps.*—These can be bought very cheaply. Buy a number of flaps and boil them, adding a little salt to the water. When cooked, put aside until next day. The water in which they are boiled makes excellent stock for soup or gravy. It should be allowed to stand all night, and in the morning the fat should be carefully removed, melted down, and poured into a jar. This fat is excellent for frying or other purposes. The fat should also be removed from the mutton flaps, and that, too, can be rendered down in the oven to provide more dripping. The meat in the flaps can be minced to make curry, or, with the addition of minced bacon, onion, and bread crumbs, it can be made into a very appetising pie. The minced mutton, flavored with pepper, salt, and onion, can also be used for meat turnovers. The pastry for these being made of mashed potatoes mixed with flour, an egg, and a little milk, to make a firm dough. Dripping is used for cakes and pastry; and in making cakes, if cream of tartar is added when the dripping and sugar are being beaten together it helps to disguise the taste of the dripping. *Pot Cleaner.*—A split peg makes an admirable pot cleaner. It removes porridge and milk most effectively, and the end of the peg, being soft and rounded, does not scratch the saucepan. *Use for Eggshells.*—Eggshells are most useful on washing day. Save and crush them and put them into the copper with the clothes, and they will help to make them beautifully white. *Quilts.*—A white quilt which is wearing out will last much longer if lined with an old sheet, especially if the sheet be torn down the middle and the side edges stitched together, bringing the less worn parts to the centre, where the wear is heaviest. Face towels should be turned ends to middle when half worn. Tablecloths, when wearing thin, may have their lives lengthened by cutting off 2in. or 3in. from one side and one end. This will bring the stronger parts to the edges of the table where the wear is the greatest. *Use for Candle Ends.*—These may be saved by putting a penny over the top of the candlestick, or putting a cork in the hole. The candle end resting on this may be burnt right down. Candle ends, too, if melted and mixed with a generous quantity of turpentine or kerosene, make good furniture polish. Odd bits of soap should be saved, put into a saucepan or billycan, and melted down with a little water. This is easily done by standing the vessel containing them in a larger vessel of boiling water and leaving it for a few hours where the water will boil gently. When melted, stir well and pour it into a shallow dish to set. Mrs. Cassell supplied the following recipes:—*Economical*



*Pudding*.—1 cup of flour, 2 tablespoonfuls sugar, 1 tablespoonful jam, 1 small table-spoonful dripping, and a few raisins,  $\frac{1}{2}$  teaspoonful carbonate soda dissolved in a small cup of milk. Mix dry ingredients together and add milk and soda. Steam for two hours. *Home-made Soap*.—5lbs. clear unsalted fat, 5 quarts water, 1lb. resin, 1lb. caustic soda which has been dissolved in 2 quarts of water. Boil all together slowly for half an hour. Lift from the fire and leave stand until next day, when cut into pieces.

Mrs. H. Hutchesson read a paper and brought two recipes for meatless dinners. *Cheese Cutlets*.—1 cupful of mashed potatoes, the same of boiled rice,  $\frac{1}{2}$  a cup of grated cheese,  $\frac{1}{2}$  teaspoonful of dry mustard, 1 tablespoonful of milk, and a little salt. Mix ingredients together, mix mustard to a paste with milk. Form into cutlets, roll in flour. Put dripping in baking tin, when hot, put in the cutlets. Brown them on both sides. Pile on hot dish and serve with tomato sauce. *Meatless Sausage*.— $\frac{1}{2}$ lb. haricot beans,  $\frac{1}{2}$ lb. bread crumbs,  $\frac{1}{2}$ oz. butter, 1 egg, pinch of herbs, salt and pepper to taste, 1 small onion if liked. Soak beans overnight. Boil till tender, strain, add butter, herbs, egg, salt and pepper. Mix well, roll out, and fry a nice brown. The fat should boil before putting in the sausage. The water in which the beans cooked is suitable for soup or gravy.

Mrs. Oberlander forwarded the following hints:—When scrambling eggs add 1 table-spoonful of fine bread crumbs and 1 tablespoonful milk to every beaten egg. Season with salt and pepper and cook in the usual way. A little vinegar added to stewing prunes greatly improves the flavor and lessens the quantity of sugar required.

Mrs. Varcoe read the following paper:—"Small Economies in the Home are Well Worth Practising." In a well-managed kitchen there should be very little waste. The careful housewife can practise many economies in the kitchen without in any way lessening the food value of the meals she prepares. If any pieces of cake have become too old and dry to put on the table, use them to make puddings. Soak in cold water, then squeeze out the water and crumble the cake in a piedish. Beat up with an egg, a little sugar, and milk, add a few currants or other fruit, and any flavoring desired. Bake in oven the same as a custard. Or soak the cake, squeeze dry, take 1 cupful of S.R. flour to 2 cupfuls of cake crumbs, 1 cupful raisins, 1 tablespoonful jam,  $\frac{1}{2}$  cupful sugar, 1 tablespoonful dripping or butter. Mix together, dissolve  $\frac{1}{2}$  teaspoonful carbonate soda in a little milk and mix. Steam for two hours. Stale pieces of bread can be toasted in the oven until brown and crisp, then crushed or put through the mincer, and stored in tins to be used for thickening gravies and stews, or for making puddings. Cold mutton or beef can be minced and made into dry hash or rissoles. *Dry Hash* is made with minced cooked meat, mashed potatoes, and 1 onion cut up small. Add a cup of gravy, or stock if not available. Use a cup of water and 1 tablespoonful of Worcester or tomato sauce. Mix all well together. Put in piedish and cover with egg and breadcrumbs. Bake in slow oven for about one hour. *Cold Meat Rissoles*.—2 cupfuls minced meat, onion cut up small, about half as much boiled rice as meat, 1 egg, 2 tablespoonfuls flour, pepper and salt to taste. Mix well together and fry in hot fat. Serve with mashed potatoes. Other little economies are making serviettes out of the good pieces of worn tablecloths. The worn pieces can be used for cleaning windows or for dusters. A double-bed sheet, when worn thin in the middle, can be made into a serviceable single sheet by cutting a strip out of the centre, sewing the selvages together and hemming the sides. A good plan with the men's trousers is to sew a patch inside as soon as you notice the thin place. It will then take longer for the hole to appear, and when it does it is easy to turn the edges in and sew down to the patch already in place. Darn socks and stockings before the hole appears. I have saved a lot of trouble sewing on buttons by placing a small button at the back of the larger one. This plan is particularly good when sewing brace buttons on trousers. Sew the two buttons on together and they will stop there as long as the pants last. (Secretary, Mrs. W. Varcoe.)

#### PARILLA WELL.

May 19th.—Present: 19 members.

*JELLY MAKING*.—Mrs. Simpson read the following paper:—*Apple Jelly*.—Cut up under-ripe fruit, seeds and skins, cover with water and boil until soft. Strain through jelly bag, and to each cup of juice add 1 cup of sugar and boil for half an hour, or until it sets. Test a little on a plate. A few cloves give a nice flavor. *Quince Jelly* is made just the same; but another recipe, which is more economical, is as follows:—6lbs. quinces, 6 pints of water, 6lbs. of sugar. Boil all together without cutting quinces for four hours, take out quinces and pot the juice. The quinces can be served for dessert with cream or custard. The quinces must be rather green to give the best results. *Lemon Jelly*.—First day—cut lemons into slices, to each 1lb. of fruit add 1 quart of water and let stand 24 hours. Second day—boil 20 minutes and stand as



before. Third day—boil pulp and strain. To every cup of juice add 1 cup of sugar and boil from 20 to 30 minutes. *Citron Marmalade*.—Slice fruit very thinly, to every pound of fruit allow 5 cups of water, let stand over night, then boil for 20 minutes and let stand another night. Weigh the pulp, and to each pound of pulp allow 1½ lbs. of sugar, boil one hour. When boiling strain off the juice and boil separately for jelly. The Secretary then read the article, "The Uses of Hessian in the Home." (Secretary, Mrs. S. Burford).

#### PARRAKIE.

April 28th.—Present: 14 members.

**HINTS FOR JAM-MAKING AND JAM RECIPES.**—Mrs. Watts contributed the following paper:—It has been found that if the amount of sugar per pound of jam is up to a certain amount that the jam will keep well; if over this amount the jam will crystallise. If, on the other hand, the proportion of sugar is not large enough, the jam is liable to ferment. In making most jams, ½ lb. sugar to 1 lb. fruit is sufficient. In cooking jam I find it best to boil briskly, but one must be careful to stir well to keep it from burning. A good plan is to grease the inside of the pan with a little butter to prevent burning. *Dried Apricot Jam*.—1 lb. fruit, 3 lbs. sugar, and 5 pints water. Soak apricots over night and boil for one hour. *Quince Honey*.—Five large or seven small quinces, 5 lbs. sugar, 1 pint water. Pare, core, and mince quinces, boil sugar and water for one hour, add minced quinces, and boil for 1½ hours. *Quince and Melon Jam*.—10 lbs. melon, 6 lbs. quinces, 12 lbs. sugar. Cut up melon into slices, sprinkle with a few pounds of sugar, and stand over night. Boil for one hour. Pare and cut up quinces, stew for one hour, separate from melon, in some of the melon syrup. Then place melon and quinces together with remainder of sugar and boil for 2½ hours. When making apricot jam it is best not to put sugar on the fruit over night. Stone apricots, put into the pan, add one cup of water, and boil until fruit has boiled to a mash. Then add sugar. *Marmalade*.—4 lbs. Poorman oranges, 12 lbs. sugar, 16 cups water. Slice oranges thinly, put into pan, then measure 16 cups of water, pour on the cut fruit, and allow it to stand all night, then boil for half an hour. Add 12 lbs. sugar, and boil hard for another half-hour. Do not forget to boil just after the sugar has been added, otherwise the marmalade will not jelly. (Secretary, Mrs. M. Cabot.)

#### WARCOWIE.

May 26th.—Present: Seven members and five visitors.

**SOAP MAKING.**—The Secretary, Mrs. A. Crossman, read the following paper:—"The recipe I use makes 18 lbs. of soap. This costs about 2s. 8d., and as the cheapest soap costs about 8s. this represents a saving of 5s. 4d. Ingredients—6 lbs. fat, 2 galls. water, 1 lb. resin, 1 lb. tin caustic soda, 2 ozs. borax, and ½ lb. ammonia. Method—Boil fat and water together, add crushed resin and borax, bring to a boil again, then take off fire and add caustic soda. This must be done carefully, because caustic burns very severely if it touches the skin. It is best to set the bucket of soap somewhere out of the breeze, and then add the caustic in small quantities, just a few spoonful at a time. The caustic causes the mixture to boil very furiously, and if too much caustic is added at a time it will boil over. Put the bucket back on the stove and boil slowly for 2½ hours, stirring it now and then. Do not have too big a fire or it will boil over. When boiled enough, take off the fire for a while, say half an hour, and then stir in ammonia dissolved in 1 pint of boiling water. It is not necessary to go to the bother of pouring into moulds. I use a bucket that the handle will slip out of, and I leave the soap in the bucket for a day or more until it is set, then take the handle out of the bucket and turn the soap out in a block. This I leave for another couple of days, and then cut up the soap into bars or pieces and pack them in a box and allow them to dry for a month or more, when it is ready for use. Always make a fresh supply before the previous lot has been used out, so that it has a chance to dry. This soap lathers as good as most shop bought soap I have used, and, providing one is careful with the caustic it is not a dangerous task." Secretary, Mrs. A. F. Crossman.

#### WASLEYS.

June 4th.—Present: 27 members.

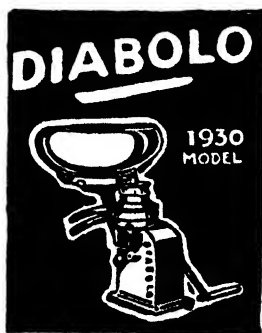
**THE FLOWER GARDEN.**—Mrs. V. Currie read the following paper:—"In a flower garden one can spend spare time to advantage, and in course of time will bring much pleasure and a return of flowers which will repay for work done. Practically every home can have a garden, especially in this district, where a supply of water is available, and with very little expense incurred the most humble home may be beautified by a garden, however small it may be. *The Layout*.—First draw a plan of the garden that will make an appropriate setting to the front of the home, taking into consideration the amount of time at your disposal for the working of it, &c., and arrange the size of



flower beds accordingly. Lawns may take up quite a large area, and will also add to the appearance. The Mail lawn needs much more attention than Buffalo grass, though when kept trimmed makes a very fine one, and one that is green all the year. A palm can be planted in the centre, if so desired, and for this purpose I suggest *Chamaerops humilis*. It is of dwarf habit, not growing more than 5ft. to 6ft. in height, is of a bushy nature, and ideal for the small garden. Not only lay out the garden for small flower beds and lawns, but leave a space on one side for the planting of a few shrubs, and along with these can be planted a mixture of perennials as well as annuals. Having laid out the garden, border each bed with jarrah edging lin. thick by 4in. deep. Around the lawn it is advisable to have it 6in. deep. With shallow edging the grass is likely to go under it and come up either in the flower beds or the paths. Choose a suitable hedge for the front, it will not only enhance the appearance, but shelter the growing plants from all weather. The Coprosma makes an excellent hedge for a small garden, it has bright green shining foliage, is almost dust proof, and always looks clean and bright. This hedge is very healthy, rarely dies off, and requires very little water. Plants should be staked and allowed to grow at the top until they reach the desired height, but should be constantly clipped at the sides. The clipping assists them in making upward growth. A few roses must be included. I suggest planting one in the centre of each of the small beds intended for the annuals. June and July are generally accepted as the best months for planting roses—they are then at their most dormant period—but can be carried on until the end of August. They thrive best in open spaces, where they receive plenty of sunshine. Plants grown in shady and sheltered positions are liable to mildew and black spot. Pruning of all roses should be completed during July, for if pruned too early the new growth will start and is likely to be damaged by frosts. April and May are the best months for planting shrubs, before cold weather sets in. Flowering shrubs are some of the most satisfactory plants grown in a garden. They give a dignity to it, and once established are very little trouble, and do not require much water. Many of them produce very beautiful flowers, and, if a careful selection is made, can be had in flower all the year round. The deciduous varieties are the most beautiful. One is the *Weigela rosea*, this is one of the most beautiful of the spring flowering shrubs, covering its branches with clusters of pale-pink tubular-shaped flowers. It should be planted in a well sheltered position on the plains. Another is the Guelder rose, or Snow Ball Bush. This is a very handsome shrub and worthy of a place in any garden, although seldom seen. When in flower the bush is covered with great balls of snow-white blooms, and makes a fine sight. All shrubs should be pruned immediately after flowering; one cannot go wrong if this practice is followed with all varieties. Most shrubs can be pruned to regulate the growth to a certain extent. The Blue Iris Stylosa has become one of the most popular winter flowers, flowering, as it does, when other flowers are scarce. During April and May the long leaves should be cut back to within a couple of inches above the crown and then given a dressing of lime to kill slugs and snails, which are very fond of the flowers. Follow this by a good watering, and this treatment will result in a wealth of bloom that make a pretty garden show. If wanted for decorating purposes, pick the flowers in the pencil stage, and they will last much longer. In April prepare beds for spring flowering annuals, and clear away summer growths. The beds should then be limed and roughly dug, and sprinkled liberally with lime again. They should be left for a fortnight to be sweetened by the sun and air. This exposure of the soil in a roughly broken up condition is most important, and without it one cannot expect good results. The use of lime can be overdone unless it be accompanied by liberal manuring. For average conditions I recommend liming every other year. After the fortnight has elapsed water well and dig several times, until the soil is broken to a nice, even tilth. Then give a liberal dressing of stable manure, fork in lightly, rake evenly and remove all lumps. The beds are then ready for the planting of young seedlings, which have been previously raised in pans or boxes. More satisfaction is obtained in raising your own plants than buying them from the nursery. It is advantageous to be able to transplant them quickly from the seed boxes to where they are to be grown, especially during summer, when great precaution needs to be taken only to transplant when a cool change springs up or on a dull day. After planting, water well, not overhead with a hose, but fill a bucket with water and with a dipper or wateringcan pour gently around each plant. During the growing period keep the soil well cultivated. Keeping the surface loosened will encourage rapid growth. As the plants come into bloom, give them a little weak liquid manure once a week. Neutral sulphate of ammonia makes an excellent stimulant for this purpose, using a level teaspoonful to 1gall. of water. Do not exceed this strength, and do not use it more frequently than once a week. The flowers will be much larger and of brighter, richer color than if it were not used. Make sure the ground is moist before applying liquid manure of any kind. Where any patches of clover exists in lawns, rub sulphate of ammonia well into them. It must be used in a dry state and



allowed to remain dry for a few hours. It will cause the clover to turn black, and although the grass will have a scorched appearance, it will come through again without any difficulty. The clover will not reappear. In a small garden it is easier to plant and to plan out the garden if the plants are massed. In doing this the effect will be far better than any mixed lot of flowers. Plant the mixed varieties in the border with a few shrubs. It is not suggested that in all cases only one variety should be grown in a bed, for some of the best results are secured when good contrasts of color are effected. For example, last summer I planted beds of Rosy Morn Petunias with a double row of Blue Ageratum around the edges of each. These made a most brilliant show that lasted for months. The winter previous I had beds of Iceland Poppies bordered with Papilio Blue Violas, and there are many other varieties that could be planted likewise. It is not wise to plant the same kind of flower two seasons following in the same beds. The Blue Brachycome (Swan River Daisy) is very suitable for bedding purposes, is of dwarf habit—growing 6in. high, and covers itself in spring with Cineraria-like flowers. Another interesting and pretty plant is the Night Scented Stock (*Matthiola bicornis*). This grows about 12in. high and has flowers similar to the single stock, only very tiny, and of a light lilac shade. The flower closes in the day time and opens only at night, and the perfume is delightful. It is also a spring flowering annual. Iceland Poppies are the most useful of all winter flowers for indoor decoration. There has been a great improvement in them during the last few years. First, the old varieties were superseded by the Sunbeam strain, which included tangerine and lemon shades, then came the Coonara Pinks—a mixture of pinks and other shades, and now Rose Lustre has made its appearance in the last few years. It is no doubt the finest and richest colored Pink Poppy that has yet been introduced. It is unequalled for those desiring pink flowers. At the end of September or beginning of October it is time to sow seed for the raising of summer annuals. Generally speaking, summer annuals are very much easier to raise from seed than many spring flowering varieties. The weather is mild and warm, and seeds germinate well and quickly. Sow in shallow pans and cover seed with a light sandy soil with a little manure sprinkled on top. This will help to keep the surface from drying too quickly. The best method for watering is to place the pans of seed in a larger one, containing 3in. to 4in. of water,



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and allow them to stand until the dampness comes to the surface. There is then no fear of washing fine seed, such as Petunia, &c., away. The earth will also hold the moisture longer, and results will amply repay for the trouble. During summer hot and squally weather can be expected, so that one must consider those plants best adapted to such conditions and choose accordingly. Keep to heat-resisting ones, such as Petunias, Phlox, Ageratum, Zinnias, &c. Get summer seedlings planted out during the first and second week in December if possible. After planting, water well, and cover the surface with a thick mulch of either stable manure or straw. It will then be only necessary to water once a week, and plants will stand up to the hottest of days under such conditions. There are so many beautiful summer annuals to choose from that it should not be difficult to make the garden gay during that period. *Zinnia linearis* is ideal for growing as a border to a mixed flower bed, and looks well in masses. It is a dwarf grower, having small narrow leaves. The plants cover themselves with tiny single deep-orange flowers, similar to small French Marigolds. The plants keep in flower for months, and one never notices the withered blooms. *Amaranthus tricolor* grown in a mixed border makes a gorgeous show with its striking foliage in green, yellow, and crimson shades. The Miniature Sunflower is another favorite for the border, and will provide a wealth of blooms for cutting as well as a fine garden show. The Miniature Red Hybrids are particularly good for decorating purposes. Klondyke Cosmos should not be overlooked. The foliage is beautiful, and they make handsome garden specimens, requiring some space to show to advantage; 4ft. between each plant is not too much. The flowers are orange, and follow other Cosmos varieties, flowering in late autumn. Zinnias are hardy, and make a brilliant show. The Giant strain are particularly fine, having very large flowers. When about 6in. high nip out the centre of plants to encourage them to branch out. This also applies to Phlox and Petunias. These should be grown in masses to get best effects. Asters are a much admired annual for their richness of coloring, beauty of form, and profusion of bloom. The Giant Crego is the finest type to be had, and looks best when grown in mixed colors. They do best in rich, deep, light soil, and are much benefited by mulching with manure. I would like to draw your attention to a very fine ornamental grass, *Tricholona rosea*, that covers itself with fluffy copper-pink seed-heads. It is excellent for mixing with floral decorations. November is the time for the sowing of the seed." (Secretary, Mrs. M. Wilson.)

*Summary of Meetings, &c.*

| Branch.       | Date of Meeting. | Members Present. | Subject.                | Secretary.       |
|---------------|------------------|------------------|-------------------------|------------------|
| Kangarilla .. | 21/5/31          | 10               | Annual Meeting .....    | Mrs. M. Steer    |
| Auburn ....   | 29/5/31          | 5                | Pattern Afternoon ..... | Miss L. Dennison |
| Williamstown  | 3/6/31           | 10               | Paper—Mrs. G. Cundy ... | Mrs. A. Cundy    |

## SOUTH-EAST DISTRICT.

### RENDELSHAM.

May 2nd.—Present: 10 members and five visitors.

**POULTRY AS A SIDELINE.**—The following paper was contributed by Mr. W. Smith:—"Many farmers if they knew the profits derived from poultry farming, when correctly conducted, would be astounded. When I suggested growing wheat for poultry only, doubt was expressed as to its practicability. Had those people accepted my proposition and used their wheat for poultry raising, they would have received at the rate of 10s. per bushel for their wheat instead of approximately 1s. 9d., which figure does not include bags or carting, two very considerable items in the cost of production. Referring to the above, I do not include those who grow wheat exclusively, but to the average mixed farm in this district. The following figures will give some indication of the value of the poultry industry. For the year ending June, 1930, the value of the industry on present day values was £950,542. The number of poultry in the State as on June 30th, 1930, was: Fowls 1,552,760, ducks 50,102, geese 16,555, turkeys 46,401, a total of 1,665,818 head. These figures offer more room for thought in the direction of food consumed. It can be taken as a reasonable basis that each head of poultry consumes 40zs. of wheat per day, whether in the form of wheat or bran or pollard; this is equivalent to approximately 2,500,000bush. of wheat per year. The average consumption of wheat per fowl can be taken as 1½bush. per year, equal at present day values in this district



to 2s. 7½d. The average production of a high-class fowl is 12 dozen eggs per annum. Taking the present price offering at the local store, as an average for the year, at 10d. per dozen, it would show a return of 10s. for 2s. 7½d. worth of wheat. These figures are fairly reasonable, and give an insight into the value of poultry if reasonably tended and cared for. Very few primary industries can show such high profits. The number of eggs exported from Australia for the past season up to December, 1930, was nearly 200,000 cases of eggs, each containing 30 dozen. South Australia's share of this total was 25,000 cases, valued at £50,000. The total value of exported eggs for Australia was £430,000. South Australia also has a large interstate export trade of eggs in the shell, and egg pulp, estimated at £150,000 per year. If all other primary industries could show such handsome returns, farmers in Australia would be in a better position to-day. If a farmer wishes to patronise State industries, everything necessary to equip a poultry run can be produced in our own State and purchased at reasonable prices. This is an ideal district for rearing runner ducks. We can also grow every kind of food necessary at a very reasonable cost for their upkeep. Even rabbits can play a very important part in duck egg production. Meat is a very necessary part of a duck's diet if maximum results are to be obtained. I usually boil about 20 rabbits per day for my poultry. This is supplemented with unlimited quantities of green food, the birds having a free run in a large patch of chow moellier and mangolds. They also receive approximately 40zs. of wheat per day per bird. The poultry benefit greatly by having a free run in the green feed; they can always find it fresh and appetising, and nothing is wasted. The next most important item is water. Too often sick birds are noticed on farms, and this is not to be wondered at when one notices the filthy water they are given to drink, out of any rusty tins or dishes, perhaps filled a month before. So long as these receptacles have water in them, no matter how dirty, the owner does not trouble to refill nor cleanse them. They are usually left out in the blazing sun. On many farms the birds are allowed to fend for themselves in the matter of housing, and they usually make the machinery sheds their roosting place; then when a machine is needed the poultry is blamed for the damage. In this district the cost of housing is trifling. It is possible to procure the timber for the cutting, and the thatch for the cutting. I prefer cutting grass or tussock for roofing, as it is much cooler in summer and warmer in winter than iron, and, so far as I have observed, does not harbor vermin. My run is built on a dry shelly bank, so that the shellgrit problem is solved naturally. The green feed grows within 50 yards of the run. Only the very young birds need the green feed plucked and carried to them, which is done every evening, scattering it under a thatched shed to prevent it shrivelling too rapidly when the sun gets on it. The water also is always under a thatched shed. I fill the dishes every morning and night, after flushing them with a solution of bluestone to minimise disease. I attribute the good health of my poultry to the use of bluestone. I also have a pond under a thatched shed for the use of the ducks. This I usually clean out once a day, and refill with fresh water to which is added a kerosene bucketful of bluestone solution: about 20zs. bluestone to a 4gall. bucket. I usually put 10 to 12 buckets of water in the pond. If I omit the bluestone, the water has a strong smell. The ducks make much use of the pond in hot weather, and the labor of making it has been amply repaid. Very few losses of poultry from hawks are experienced, chiefly because there are a number of tussocks growing about the run. One warning cry from the male bird, and not a chicken is to be seen. Even the smallest will run for a tussock. The tussocks also act as shelter in hot weather, the poultry often preferring them to the shed. Occasionally crows are troublesome. In such a case I fix an egg to the plate of a strong rabbit-trap and cover all but the egg with straw. The crow is usually in the trap next morning. Place the trap on a shed where the poultry cannot reach it. Farmers who knowingly sell bad eggs should consider the effect those eggs have on the price of eggs in Adelaide and the local market, and they would find that it reduces prices to a marked degree. One has only to observe the difference in the price of guaranteed fresh eggs to those usually classed as 'collectors lots.' I consider that the storekeeper or collector should instal a testing machine. He would quickly discover those marketing rotten eggs. Incidentally, the honest poultrykeeper would also benefit by an increase in price for eggs that were known to be fresh." (Secretary, Mr. F. White.)

#### TANTANOOLA.

May 2nd.—Present: Nine members.

**PIG BREEDING AND RAISING.**—The following paper was read by Mr. G. Bird:—"First select a good breeding sow and mate her with a boar of a breed suitable to get best breed of pigs for fattening purposes. I favor the Berkshire-Tamworth cross. It produces pigs which are quick growers and makes an ideal bacon carcass. It is also advisable, when starting pig breeding, to buy some good suckers and keep them until they are about five months old, and then pick out the young sows that will make good mothers and mate them with the boar. Always give the young sows the best attention. Do not



over feed them, but give a change of food; this will keep them fresh and healthy, but not too fat. Under no conditions must they have boiled or raw meat, as it tends to make them eat their young. A good breeding sow should rear at least from eight to 12 young pigs if properly fed and cared for. A sow should have plenty of exercise. Provide for the sows a small paddock, about a quarter of an acre, with a good, warm shed on it. With a paddock of this size, three sows can be run, but always put them in a sty by themselves about a fortnight before farrowing. Also provide plenty of bedding a week or so before farrowing, for if the sow is a good mother she will prepare her own bed and is not likely to smother her young. It is also a good plan, when the suckers are about three weeks old, to make a small place for them so that they can leave their mother and learn to drink by themselves. This will not be such a strain on the mother pig, who has to rear 10 or 12 young pigs for six or seven weeks. Also the suckers that have learnt to feed themselves go straight ahead after weaning. *Fattening Pigs*—To fatten suckers I give them about four weeks in a sty fed on milk and grain, and then one week on milk and water, and also grain. I then turn them into another sty, about twice as large, and feed only on water and grain fed from a self-feeder. By mixing the water with the milk it is much better than putting them on to water straight, as very often a pig which has been well cared for when a sucker does not take to water unless very thirsty. A pig does much better if there is always drink in the trough, especially if fed on grain. After feeding on grain and water for about eight weeks, a pig has grown enough to top up for market. Four weeks on milk and grain, after feeding on grain and water, should be sufficient to produce a good bacon pig of about 120lbs. dressed weight. Good bacon is made from well cared for suckers, given a good start, and then allowed to grow before topping off. A pig should be at least six months old when dressing 120lbs. Another good point is that by giving a pig time to grow it does not lose so much weight when travelling to market. After giving a sucker a good start off, have a paddock of green feed. The best green feed I have grown is rape and rye mixed. Turn the pigs into the green feed, and all they require is plenty of good, clean water to drink, and very little grain. A pig about three months old, turned into a paddock, will grow well and keep healthy and fatten very quickly when shut up in a sty. The only thing about this method of feeding is that it takes about a month longer to get them on the market, but it pays because it saves so much hand feeding, and they also make very good bacon pigs." Discussing the paper, Mr. Bird favored sour milk instead of fresh milk for feeding to pigs. He also thought that crushed barley was far better than whole barley. Mr. Edgecumbe found that pigs did well on boiled potatoes with a little crushed barley mixed with them. (Secretary, Mr. H. Kennedy.)

## UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.69in.).

May 1st.—Present: Seven members.

**CARE OF THE FARM TEAM.**—The following paper was contributed by Mr. W. Zaenker:—"The horse used for farm work should not be too heavy but of a good upstanding type, and active in appearance. The horse that is not too heavy in the legs will stand a day's work better than a clumsy one. Fine horses are the country's pride, and are a better proposition than the tractor in these times. After a day's work the horse when let loose will first go for a drink, and there should always be plenty of water handy. After it has sufficient water the feed is the next. For that there should be proper mangers so that the feed remains clean and also in such a way that they cannot throw out half of the feed. To protect horses from the wet and cold a good stable is essential, a straw roof preferable, if possible; it is cool in the summer and warm in the winter; it will greatly help to keep the horses in good condition and health. Working horses should be given plenty of time in the morning to have a good feed before going out to work. When on heavy work they should be well fed and looked after. The use of the currycomb every morning after the horse has had a heavy day's work the day before will greatly improve the appearance of his coat. Horses kept in fair condition will, as a rule, need less feed. Short hay is better to feed than that from a rank crop. If straw is to be fed, chaffcutting is the better proposition. In the busy time of the year horses should always be given corn, to give them more heart. They should be watered at least four times a day, if possible. Pay particular attention to the harness. The collar should always be cleaned before using after a spell; each horse should have its own collar, and it should fit perfectly. If sore shoulders appear, it is not always necessary to give the horse a spell. Try another collar, it will sometimes allow the sore to heal again by working. The chains of the individual horse



should be of the same length, and all swings adjusted evenly, so that every horse pulls its share, which will greatly minimise sore shoulders. Do not forget to give attention to brood mares, because the next team depends on them. In the latter part of the season they can be worked to within a few days of foaling. When working them, they should always be on the side of the team and not in the middle. Horses should always be treated kindly, but at the same time firmly. Horses generally respond to kind treatment; occasionally one shows bad habits, but these are generally the result of mishandling during breaking in. The best time to educate a horse is when breaking them in. I have a dislike to using the whip, especially in the team, and usually manage to get a fair amount of work done without its use. As is good advice with the tractors so with the horse team, 'under loading is preferable to over loading.' 'Discussing the paper, a member stated that for sore shoulders kerosene mixed with lard was very effective, it kept the sore soft and did not allow a hard crust to form over the sore. To ease a collar over the sore put a few stitches through the lining and pull towards leather firmly, leaving a hole over the sore. In feeding, the following suggestions were offered:—Crushed oats and bran; crushed peas; boiled wheat for aged horses (using half boiled wheat and half chaff). (Secretary, Mr. E. Wurst.)

#### MORCHARD (Average annual rainfall, 13.50in.).

May 1st.—Present: Eight members.

MIXED FARMING AS A MEANS OF ECONOMISING.—Mr. P. Schultz read the following paper:—"The time has come when farmers must take into consideration increased taxation and low prices for products of the farm. Wheat growing alone is being carried on at a loss, so also is sheep. By combining these activities farmers can make a better living at a much less cost. A farmer having a few cows, sheep, poultry, and pigs, and any other sideline has a chance of making a living as he goes along, and one will be surprised at the end of 12 months at the manner in which the expenses have been kept down. By careful management, saving, and a little extra work, the farmer will be able to cut down liabilities to a great extent. Farmers, as well as the rest of the community, have been living right up to their incomes. On almost every farm one can find old implements, but instead of rebuilding these at a small cost new machines were ordered and the old ones discarded. Farmers who are the best off are those who have been the most careful. If the holding is developed as a mixed farming proposition, I believe the farmer will be much better off." Mr. B. McCallum thought sidelines were often neglected until prices for wheat and wool slumped. Mr. Lang thought that the average machine was not built to be mended. Mr. Kupke said his experience was that when cropping 600 or 700 acres of wheat and running 1,000 sheep, sheep gave the better return. Mr. A. McCallum thought that most old machinery, by the time parts and wages were paid for remodelling, would be half the price of new machines. (Secretary, Mr. A. McCallum.)

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

#### KOOLUNGA (Average annual rainfall, 15.52in.).

May 4th.—Present: 16 members.

WORKING THE FALLOW.—Under the title "Items of Interest" the following paper was read by Mr. H. Spencer:—During the past few years there has been much discussion on the methods of fallowing and quantities of super sown per acre, and unless we make a careful study and keep a watchful eye over the results we shall be none the wiser. With present prices it is only with careful reckoning up of costs that we are going to prove the most economic way to work, and thus live in hopes of balancing our budgets. I have been an advocate of the cultivator for breaking up land for fallow, and I am still convinced that on most classes of land, and especially on the heavier land, it has once again proved itself at reaping time in results. For breaking up land for fallow, the cultivator can be worked for practically half the cost of the plough, thus making a substantial saving in expense. The work can be completed in less than half the time, thus assuring an early completion of the fallowing, and, as the result of early fallowing has stood out bushels to the acre in advance of late fallow during the past five years, it leaves nothing more to look for from that source. Twelve months ago last harvest, with tests carried out in plots of various super, the double quantity of super per acre showed a profit of 10s. 9d. per acre. Last year we did not sow any plots, but drilled in a few rounds in various pieces to see what the results would be. On one piece, in which we were able to check the results fairly accurately, the heavier dressing, equal to 180lbs. of 45 per cent. super per acre, returned a little over 3bush. more per acre. On working out the cost of super per acre (8s. 5½d.) compared with 84lbs. 45 per cent. (3s. 6½d.) and wheat at 1s. 9½d. per bushel, leaves a small profit of 5½d.



per acre. This looks as if it is not worth the extra manure, but we must remember that if wheat was worth 5s. per bushel it would be showing a profit of 10s. 1½d. per acre. One remarkable feature was that during the dry period in September last year, when the wheat was making for head and some of it trying to get out of the flag, where the heavy dressing of super was applied, the crop was heading very well, but on the lighter dressing there was not a sign of a head to be seen, and the crop was feeling the effects of the dry weather very severely. (Secretary, Mr. E. LePage.)

CALTOWIE (Average annual rainfall, 16.85in.).

April 27th.—Present: 32 members.

**MODERN METHODS OF FARMING.**—Mr. N. Royal presented the following paper:—Farming methods employed by the pioneers of Australia are vastly different to what they are to-day. First were seen the single furrow ploughs, then the double furrows, and it was not so long ago when three furrow ploughs were used extensively. To-day it is not uncommon to see seven furrows and occasionally up to 10 furrows when the farmers have the power available to haul them. The practice once adopted was to plough the land just prior to seeding and work it down with heavy harrows, broadcast the seed either by hand or by machine, and then bury the seed by again harrowing. To-day ploughing is done as early as possible in the winter to allow as much moisture as possible to soak in during the winter rains and to put the soil in good condition to work, in order to get the clods broken down ready for later cultivations in spring. It is then worked with the cultivator to kill weeds, and later on a second cultivation may be given either with the cultivator or harrows. During summer months the farmer has other work to do and can leave the fallow well alone, if it is in good condition with a fine mulch to stop evaporation. When the season breaks sufficiently to germinate weed seeds, I advise the use of harrows to help germination, so that when seeding commences there will be as many weeds started as possible. These can be killed and give the young wheat plant a good chance to flourish. With the advent of super we have the drill, which will sow the desired quantity of seed and super per acre, and then inventive genius gave us the combine, a combination of the drill and cultivator, which is practically universal to-day, thus saving the farmer money, inasmuch that besides having a seeding implement, he also has the cultivator, which can be worked independent of the sowing mechanism. The combine needs only one man and one team (or tractor), whereas if cultivator and drill are independent machines more labor and more power are required to do the work. The latest improvement in farming in recent years is the treatment of seed wheat, which is of vital importance. Once farmers were not so particular over this as they might have been. They took seed from any heap in the paddock and very often, having been reaping two varieties of wheat and emptying at the same heap, the seed became mixed. At other times varieties were mixed by not cleaning the machines when changing from one wheat to the other. Another mistake made is in not selecting the best sample of the plumpest grain with the least cracked grain and weed seeds in it. Having selected the seed, the earlier farmers cleaned it by means of the wind which blew away the chaff, and the next step was the invention of the winnower, which also employed a blast of wind to carry away any light matter, and even with these machines the seed was made clean, but was not of a uniform grade. Just prior to sowing, the seed was pickled in a solution of bluestone or formalin. With bluestone, the pickling can be done in a 10 per cent. solution some time before seeding if it is stacked in the open to dry, but using formalin it must be sown immediately. To-day's method is to clean and grade the seed with a grader and pickler in the one operation. With the latest machines practically 100 per cent. efficiency is obtainable in the extraction of foreign seeds, such as barley and oats, leaving only the best seed for pickling. This is done mechanically in a dustproof container by the use of copper carbonate at the rate of 1½ozs. to 2ozs. per bushel of clean, graded seed, the container being built into the grader in such a way that the wheat is delivered to it in one continuous stream, as also is the copper carbonate, which can be regulated to give the desired quantity. The pickler revolves, which causes the wheat inside to be continually moving and falling about, thus creating a fine dust of copper carbonate to be present, which adheres to the grain, which is then delivered to chutes for bagging. The seed is then ready for sowing or may be stored without in any way affecting its germinating powers, whereas with wet methods the germinating powers of the grain were impaired, especially when strong solutions were used for wheat badly affected with bunt. The advantage of dry pickling and grading is that the seed germinates more quickly, the plump grain being able to feed the young, tender shoots and give a more robust plant and a healthier crop which is more able to resist disease and dry spells. Fallow having been well prepared with as shallow a seed bed as possible, the seed is then sown so that it falls on this firm seed bed, which, if there has been a fine mulch covering it, will be moist and will start the seed to germinate and flourish. The successful farmer having worked his land well, and sown the best of seed, pickled dry, in a shallow seed bed, has the evidence before his eyes of good farming methods employed, and thinks of how he is to gather in the harvest. The hay crop in earlier days was cut by the sickle, and later with the mower, raked



together by a horse rake, cocked, and then carted loose. Operations now are easier and quicker. The binder has been with us for some years, and has well earned its place on the farm. Reaping is done with a header and reaper-thresher, either power driven or used with horses, which gathers the heads, threshes the grain out of the head, and cleans and delivers the wheat to the grain box or bags. This is a big saving in time and labor to the now obsolete methods, such as threshing with flails and cleaning with the wind and then bagging, or the later method of using strippers and winnowers, the latter being hard and rather disagreeable work. One advantage with stripping and cleaning with the winnower is that the cocky chaff can be saved for feeding purposes through the winter, and in cases where hay cuts have been light, to supplement the hay. I have purposely refrained from bringing tractors into these remarks previously, because it is, or was, a vexed question among farmers, but I maintain that, could we get more for our products and cheaper fuel as in previous years, power farming is an improvement on the old method of horse traction. It enables farmers to crop more, do their work more expeditiously, with the consequent better working of the land and the saving in wages of employees, and the curtailment of much uncongenial work, such as chaffing, grooming, harnessing, and cleaning out stable yards, allows the farmer more time to devote to side lines or experimental plots, and to keep in touch with the latest agricultural practices." (Secretary, Mr. R. Wilkinson.)

### LOWER-NORTH DISTRICT.

#### (ADELAIDE TO FARRELL'S FLAT.) BUCHANAN.

May 1st.—Present: 12 members.

**MODERN METHODS OF CLEARING HEAVY TIMBER.**—Mr. L. Bell read the following paper:—"With high land values it is essential that every available acre be brought under cultivation. Providing that the timber to be dealt with is green, ringbark all trees large enough and leave until all timber is dry, which takes about three years. In the meantime, keep the block well stocked with sheep, which will keep down all shoots, and the stumps will eventually die. Then, after harvest, as soon as it is possible to burn, get busy with fire and axe. Do not go through the scrub and light a fire indiscriminately, but start in a systematic way by firing first, say, one or two acres. As the trees burn down, keep rounding up the branches and trunks on to the stump, which will finally burn out. On stumps that will not burn out readily, cart dry horse manure, which is very effective. In the case of very solid stumps that refuse to burn out, use a few plugs of dynamite or gelignite. For a stump or tree, say, 18in. to 24in. in diameter, use about three plugs. To be most effective, take 1½in. to 1¾in. auger, bore the hole in level with the ground at an angle of about 45 deg. down into the stump to a depth of about 15in., and then the fire will do the rest. To clear land which is to be put under the plough straight away, the grubbing machine and tractor can be used. When the ground is soft, the tractor is a very quick and easy way of pulling down small trees and stumps up to, say, 1ft. thick. When doing this work with the tractor, one must bear in mind the fact that a machine is being used which costs perhaps up to £500. For timber which is too large for a tractor, it is necessary to use the grubbing machine, which, though effective, is very hard work. The job of pulling down finished, the tractor is again a very useful power unit for dragging away trees or stumps from the piece of land to be ploughed. These can be pulled off on to reefs or any such places, where they can be burned up when dry." (Secretary, Mr. L. Bell, Marabel.)

#### NANTAWARRA (Average annual rainfall, 15.90in.).

April 30th.—Present: 10 members.

**THE HORSE IN AGRICULTURE.**—Mr. R. Nicholls read an article on this subject, and in the discussion that followed, Mr. C. Nicholls thought the national aspect of the subject was very important, but if it made the balance on the wrong side of the ledger it became a personal one. When good horses were from £50 to £60 each, and chaff £8 per ton, a tractor was a reasonable proposition. There were places on the farm where the tractor would beat a horse team. Mr. W. Starkoy said that Australia was subject to drought, and in such times the tractor was cheaper. A tractor very often did two men's work. A tractor owner should do his own repairs if possible. Mr. R. Nicholls said at the present time horse feed and wheat were cheaper, but tractor fuel the same price; this, together with heavy depreciation on the tractor, was a factor against power farming. Mr. E. Hamdorf said a crossbred type of horse was best for farm work. The present was a lean period for tractors, but they would again return to favor. Mr. F. Nicholls said the tractor farmer was sometimes over capitalised, the tractor cost from £500 to £600 when a good horse team could be purchased for £200 to £250.



## OWEN.

April 27th.—Present: 11 members.

**FARM BOOKKEEPING.**—The meeting took the form of a Question Box. A keen discussion arose on the question "Farm Bookkeeping," and opinions were in favor of a ruled ledger. The unanimous opinion of members was the value of keeping all farm accounts most accurately. Mr. Bowen stated that if farmers kept a record of their incidental receipts and expenditure in the "rough diary" usually kept by farmers to record sowings, rainfall, seasonal conditions, &c., their books would be kept far more accurately. Mr. Doyle stressed the advantages of elementary costing as applicable to the farmer. Various questions were then asked and replied to by Messrs. C. Marshman and P. Doyle on the "marketing of eggs" and the advisability of washing a soiled or dirty egg. A further interesting discussion arose over "power farming," opinions being in favor of tractors with the return of better prices, but under existing conditions everything was in favor of the horse, although tractor owners thought it advisable to incur a little expense and rush seeding operations. (Secretary, Mr. H. Bowyer.)

## PENWORTHAM.

April 2nd.—Present: Nine members.

**EUROPEAN AGRICULTURE.**—The Hon. Secretary, Mr. C. Jenner, read the following paper:—"What strikes the Australian most is the old time methods of agriculture in use, but on examination these are found necessary to the climatic conditions, for the Australian harvesting machinery could not be used to advantage. In seeding, part of the acreage to be cropped is sown with fall or winter wheat, sown in late November or early December. This lies under the snow until the spring thaw in March or April, and then the plants push rapidly ahead. After the thaw, farmers busy themselves with the seeding of spring wheats. Stubble land which has been fallowed after reaping is disced or cultivated and drilled in, and other fields are ploughed and sown. Seeding usually finishes about the 21st of May, therefore, fall or winter wheat has about eight months in which to grow and mature, and spring wheat about three months. Growth is very rapid during April, May, and June. Haymaking begins about the 20th June—grass or meadow hay. This consists of grasses and clovers of many descriptions which when carefully treated make excellent hay. None of the fields sown with wheat, oats, or barley are cut for hay; they are strictly reserved for grain and straw which in these densely populated cold countries has a fair market value for thatching stacks, stables, cottages, stock bedding, and fodder. All bean or pea stalks are saved for the same purpose. It is also used for hatmaking, straw mattresses, &c. For hay cutting in the open grass meadow, an ordinary grass mower is used, in the clover fields either a binder or mower, as the farmer may desire. Timber coppices and rough ground are cut by scythemen. Reaping commences in July, the fall wheat then being ripe and ready; by the time the fall wheat is cut the spring wheat is ready for the reaper. On the larger farms binders are used, the small holder usually reaps by hand, i.e., scythe and cradle, or reap hook, and very often threshes by hand, using the old time flail. Following the reapers come the stookers. The method of stooking is totally different to that practised in these districts. Stooks are placed in straight lines across the field about a chain or more apart, and are not stood upright as we do our hay. The sheaves are placed in a circle, butts outward, heads into the centre, about six or seven sheaves high. A thatched roof is then placed over each stook by inserting a sharpened stake in the centre around which straw thatch has been bound to extend for a radius of 2ft. or more. This makes the grain stook weather-proof. The reason for placing the stooks in straight lines is easily understood when I tell you that the following plough follows the reapers closely, before, in fact, but little of the crop has been carted; singles, double, and three furrows being used similar to our orchard ploughs, but heavier. Stacking in European countries has become a fine art. Some round, others oblong, or square, but all are built on the butts out principle; when a layer of sheaves is completed only one row of heads show in the centre of the stack, so the stacker as he proceeds with the next layer is not treading out grain as he would otherwise do. The stacks are about 40 tons, or about the amount a threshing machine will finish in two days or thereabouts. On the larger farms steam threshing plants are used, many of these are portable and travel from farm to farm, a 6 h.p. portable steam engine being used. Coal is cheap and water plentiful. A team of six horses can shift the whole plant—three for the engine, two for the threshing machine, and one for the trolley. Others on a smaller scale use horse driven machines with a treadmill—the horse attempts to climb a lathed elevator belt, each step pulls the belt back under his feet, this elevator belt drives a shafting on which is a pulley belting from this to the machine. Two fresh horses are used for every run. English flour mills are chiefly water driven, a water wheel and race are used. To construct the race a dam is thrown across a creek or brook, a channel is then cut from the dam to pass under the mill and back to the original stream. A bend in the brook is usually chosen for this purpose, and for safety, floodgates or sluices are inserted in the dam wall. The pressure and



speed of the water in the race drives the wheel fast enough to keep all machinery going at a reasonable speed. A few were electric or steam powered roller mills. Roasters are attached to the mills, for very often the local grain is too soft for grinding purposes without being first dried. The mills in France are on the same principle, except that the village mill is common property. It is wind driven, and is primitive. Built on a pivot mast, it is driven by four lathed sails about 10ft. long and 1ft. wide. All grain has to be carried up a ladder to the grinders, a calico pipe conveys the product to the bagger on the ground; the product is much coarser than that of their roller mills. A long pole from the mast, to which is attached a windlass and chain, the chain is looped over a post in the ground, and by this means the whole concern is winched around to get the sails in line with the wind. *Manures*.—On swamps or marshy lands marl was used to the extent of 8cwts. per acre. Marl very much resembles our gypsum. Leaf mould is also extensively used, practically on all classes of soil. Superphosphate and nitrate of soda, stable and other natural manures, of which European countries have large quantities, are extensively used—nothing is allowed to go to waste. *Stock* in Europe have to be stabled during winter and heavy straw bedded, so the supply of stable manure is good."

#### SADDLEWORTH (Average annual rainfall, 19.60in.).

May 1st.—Present: 14 members.

**DIFFICULTIES OF THE FARMER.**—Mr. A. Marrett read the following paper:—"The financial predicament that farmers find themselves confronted with to-day has not been brought about solely by the low price for wheat but rather a combination of difficulties. Wheat 34 years ago was sold as low as 1s. 3d. per bushel at Auburn. I propose dividing the paper into five parts, as follows:—(1) Over capitalisation; (2) Indirect taxation; (3) Low prices at present ruling; (4) A departure from farming methods; (5) A lack of confidence in themselves. (1) The plant, a farmer nowadays uses is unnecessarily large and costly. Perhaps a little more wheat per acre in bushels may be sown at the present time, but modern machinery is not playing any part in the increase, rather is it the influence of enterprising farmers and scientific methods, not the machinery. Since the departure from the stripper and winnower, farmers are no better off financially, while many farm laborers are infinitely worse off through lack of employment. All sections are worse off, including the farmer, especially when large commitments on account of modern machinery have to be met. Particularly do I refer to users of tractors and the imported fuel they consume; our imports until recently have exceeded exports, and the farming community has had a big say in this. If stock is taken, the modern or recent trend has been to get as much done as possible without using outside labor. I am quite cognizant of the fact that certain factors regarding the past conditions of labor have had a certain amount of influence to drive a farmer or employer in this direction. (3) Low prices, as I have endeavored to point out, are not solely responsible for the conditions. There is no doubt that the sudden drop has upset the balancing of accounts of the most prudent, which leads one to the fallacy of having 'all your eggs in one basket.' (4) The departure from real farming methods. A farm at one time was never complete unless there were sheep, cows, pigs, and poultry. Many who have been sadly hit at the present time would greatly appreciate a few cows to milk and a small consignment of lambs, wool, and pigs. There is still a profit left in pigs and a big market to explore. Wheat farming was all right while we had inflated prices. Many farmers are paying high prices for cows. These farms had eight to 12 cows previously to the inception of inflated prices for wheat. (5) Lack of confidence. There appears to be a section of the community who think the younger and present day farmer is not imbued with the spirit of their predecessors in this country. With this I do not agree. The young people of to-day will get down to the so-called drudgery, and if many of the older farming fraternity had kept good cows, the younger generation would have had some encouragement to go in for dairying. Anyone who has the handling of dairy stock will take a much greater interest in milking if they have good cows to milk. With good cows dairying is not a drudgery, but a very interesting and profitable occupation. At the present time a farmer can grow and crush his own wheat, oats, and barley, and feed same very profitably to cows. Take five bags of wheat and five of oats; and add 2s. worth linseed—about £4. A good cow will pay for this in a month. In that way one could feed a cow about 8lbs. to 9lbs. of grain a day for seven months. Her skim milk will more than pay her paddock fees and chaff bill, leaving a reasonably good margin of profit for her owner. At 1s. per pound for fat, a cow giving 380lbs. fat would net the owner about £10 10s. profit, which is a very conservative estimate." (Secretary, Mr. A. Blundell.)

#### UPPER WAKEFIELD.

April 30.—Present: 12 members and four visitors.

**QUESTION BOX.**—The meeting took the form of a Question Box. The following questions were asked:—"What is the best depth to fallow black soil?" One member suggested 3ins. to 3½ins. Others thought 2ins. would be ample. "Which is the more



suitable for growing a barley crop; land that has been ploughed up, or land worked up with a cultivator?" Members favored ploughing for best results. "Will black ground fallowed in summer time produce a better crop than when fallowed in winter?" Summer fallowing was advocated by most members. "Which is the best bread of cattle for this district?" One member considered Shorthorns as the best for general use, because when they were unprofitable for dairy uses they could be easily fattened and sold as beef. "What is the best method to prevent a nine months' old calf from sucking cows?" One member suggested a piece of motor tyre fastened around the nose with six 4in. nails driven into it at different places. "Which is the best method of picking wheat?" Bluestone pickling was preferred if the bluestone was mixed to the correct strength. Other members favored dry pickling on account of quicker germination. The Secretary then read a paper from the *Journal*, "Book-keeping on the Farm." (Secretary, Mr. C. Neumann.)

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VIRGINIA (Average annual rainfall, 17.23in.).

April 1st.—Present: Nine members.

**HUMUS.**—Mr. P. McEntee read the following paper:—"Humus is the name given to decaying vegetable matter in the soil. Unless the supply is renewed by the addition of new vegetable matter, as in stable manure or crop residues, the quantity will gradually decrease. The garden, because of the frequent applications of stable manure, supplemented by deep and thorough cultivation, is usually the richest part of an old farm. Almost any kind of soil can be made fertile in this way. Stable manure forms humus in the soil, and even the poorest soil can be changed to a garden by its use. In its natural state, the humus supply of soils is maintained by decaying roots of plants and fallen leaves. In cases where the soil has a good supply of phosphoric acid, potash, and other essential minerals, the humus tends to increase, crops become heavier, and pastures improve. Where soil is poor and climatic conditions unfavorable, natural residues are barely sufficient to supply wastage, and crops gradually become lighter, until only the hardiest plants survive. Humus confers certain physical benefits on the soil, e.g., it improves its water-holding capacity, it loosens stiff soils, allowing air and moisture to enter; it binds the coarse particles of sand, thereby improving the texture, and, when wet, gives the darker color to soil. Vegetable matter is changed to humus by the action of bacteria, and changes occur in humus. Some kinds can decompose the humus in wet soils in the absence of air, but in these cases decay ceases before it is complete. This incomplete decay causes the formation of 'humic acid,' and 'sour soil' results. This acid accumulates in swamps and peat bogs, not because of the wet, but because air is shut out. When air cannot penetrate soil, the decay of humus does not stop at the production of humic and other acids. By combining with the oxygen of the atmosphere, bacterial changes go further, forming a milder form of humus, and oxidation goes on to completion. Carbon di-oxide and water are the final oxidation products of humus. The final changes involve the disappearance of humus from the soil, but they are necessary. Soil not only requires humus, but also that it shall decay. The amount of humus varies in different soils. In swamp lands it probably forms the bulk of the dry samples. In ordinary soils, it is generally under 5 per cent. Because free access of air hastens the decay of humus, cultivated land will soon contain less humus than grazing lands. Herein lies the reason for resting farming land. Sandy soils usually contain less humus than clays, because they are pervious to air, and therefore the humus supply is burnt up more rapidly. Lime stimulates bacteria that cause decay, and so soils deficient in lime will often contain more humus for that reason. Finally, high temperatures and open soil hasten decay of humus. Soils of arid districts contain about 1 per cent. as against 4 per cent. humus in wetter areas. But while cultivated, sandy, lime, and arid soils contain less humus, they can, for chemical reasons, afford to contain less because owing to the rapid decomposition in these soils, the benefits are more quickly realised. Chemical changes which take place in the decay of humus cause the formation of nitrogen, which in itself is insoluble in the soil. This nitrogen of the humus must first be changed to simpler compounds. Ammonia and nitrates are two of these. Nitrates are the more effective form, and are the only form with which crops reach full development. Therefore, the production of nitrates within the soil is necessary to successful cropping. Nitrates are produced by bacteria of various kinds. One kind attacks the nitrogen of humus, and ammonia is the result. Other forms attack ammonia and nitrates result in the course of a few weeks under favorable conditions. The manufacture of nitrates within the soil is known as nitrification. Certain conditions are necessary:—(1) Soil nitrogen must be present, e.g., as in humus; (2) the bacteria must be present; (3) fresh air (no nitrification in clay subsoils); (4) darkness (sunlight stops or kills organisms); (5) A suitable temperature (stops in cold weather); (6) sufficient moisture (stops in long, dry spells); (7) carbonate of lime or some other base must be present. It will be seen, therefore, the humus of the soil is important to the farmer, grazier, gardener, and to all those connected with the land." Mr. Lang said the practice of heaping up fresh stable manure resulted in burning out the best qualities of the manure and left only the waste. It was best to apply it to the soil immediately. (Secretary, Mr. W. Lang.)



**YORKE PENINSULA DISTRICT.**

(TO BUTE.)

**BRENTWOOD** (Average annual rainfall, 15.52in.).

Ten members attended the meeting held on April 2nd, when a paper, prepared from Departmental literature on the subject "Facts About Wool," was read by Messrs. J. and M. McKenzie. (Secretary, Mr. G. Tucker.)

**KILKERRAN.**

May 5th.—Present: 10 members.

**SIDELINES IN RELATION TO PRESENT TIMES** was the title of the following paper by Mr. C. E. Heinrich:—"No subject connected with rural education or industries is receiving more publicity by Bureau Conferences, discussions, instructors, and researchers. Journals and newspapers of all descriptions have their distinctive spaces crammed with information gained from experimentalists and researchers from all parts of the world. America is outstanding in the enormous amounts of money expended for research and rural education. Southern European countries are amongst the foremost in practical work done in dairying and pig raising, and associated industries. The finer arts and knowledge of these occupations have taken years of sound work to acquire. There is no doubt that we forge ahead through their hard-earned information. However, it is particularly necessary to try out, under our own circumstances and climatic conditions, acquired knowledge and especially of breeds of stock. Before the advent of super phosphate the country community was practically dependent on the income from sidelines, and their products found a ready local market. With the improvement of conditions the agriculturists, whose incomes grew, specialised more on wheat and wool and neglected the smaller sidelines more and more, until to-day our main sources of income, produced under peak cost of production, have reached a record low price. (Circumstances again force the wheatgrower to see his folly of backing only one horse and to turn his face to the issue of sidelines, paying attention to petty cash, which to-day is worth more than a 1930-31 wheat cheque produced at a loss. During the last two years the fact has gradually dawned on the farmer that his general living expenses

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were being left unpaid, that the proceeds of his crop would not cover the liabilities incurred for cropping. This state of affairs is creating a general rush to varied sidelines (principally dairying and pig raising), which action will have to grow steadily, or the markets will be glutted. To enumerate sidelines, they come under two distinctive headings—cereal and stock—the two being closely associated. The growing of cereals, other than wheat, proves necessary for the economic feeding of stock. Yorke Peninsula's sideline—Prior barley—can be termed an industry, being capable of ripening this cereal with distinctive malting quality, but this barley proves an excellent feed, finding ready sale when not up to malting quality. This grain or Chevalier varieties could often be grown in other parts of the State for feed, as it is preferable to the six-rowed or Cape family. Oats grow freely in all agricultural parts of this State as secondary crop, and should be made far more use of instead of risking wheat in many instances—feeding well to all stock and even poultry. These grains are well known, and also have commercial values, but there are other cereals and grasses that are useful growers and would prove of value to cultivate just for the purpose of fodder and grain feed on the farm. Rye is well worth a trial as sown for feed, grazed, and then reaped. Lucerne, the most hardy of legumes, is most suited for our moderate rainfalls and could be grown in small patches. Stock sidelines are principally horses, cattle, sheep, pigs, and poultry. Horses can be included in this list, as the judicious selection of several mares for breeding would be an addition to plant, upkeep of depreciation, and the source of a little income when disposing of a horse. Dairying has developed in the closer settled areas, and has been neglected by the average wheat grower until recently, and those who are turning to cows have to buy and pay dearly for them, whereas, had we kept our end up we would have young stock growing into production. The cow is the most direct source of income (without risk of outlay) we have. The duties of the farm dairy invariably fall to the farmer's wife, and should not be overdone; yet the number of cows kept in most instances could be increased. Apart from the cow a little can be made out of rearing calves for beef. In that case the Milking Shorthorn would prove more profitable than the Jersey. Upkeep of a milking strain is most important, and bulls of proved breeds and studs should be bought, the Government subsidy assisting in the purchase; or several farmers in company would also make it much easier financially. The sheep is an animal kept for many purposes—a scavenger on fallows, giving a return on wool, a supply of mutton, and most important, the breeding of lambs. Sheep have decreased in numbers in the better agricultural areas through the wheatgrower diverting from the general rule of a crop every three years to one every two, but I am confident that it will be profitable to encourage more grazing. Wool, in normal times, has always given the farmer a nice return, but we are apt to drop one system for another, as during a previous slump in wool South Australia worked up quite a nice lamb trade, but when wool boomed we neglected the breeding of early maturing lambs and reverted to wool breeds, thereby losing our overseas market. The Comeback ewe is the best farm breed, but our flocks are too small to breed them up. The best proposition is a big, clean-faced Merino ewe mated to a popular English breed. Pigs are usually on most farms for bacon and ham, but raising and fattening has not been carried on to any great extent. Educational work and experiments with breeds and types has encouraged the farmer to retain grain (on account of low prices) and attempt pig raising more extensively. Southern European countries specialise in certain breeds, and with care it will be quite possible for us to produce the ideal bacon pig by means of growing a sow produced from the coarser and over-fat breeds to cross with the Large White boar. Poultry is easily kept on a farm. The fowl becomes more profitable with proper care, and produces a regular income. Breeds are numerous, but the Black Orpington appears the most popular. Proper feeding of all stock is essential. Never forget the fact that an ill-fed beast is unprofitable. Provision of roughage is necessary for the winter months, and a quantity should be stored for dry periods. Study time and convenience in arranging yards and automatic feeders for pigs and sheep, so that your time in busy periods is not unduly taken up. Do not plunge into sidelines extensively, as initial cost is a big consideration; rather purchase something good and breed up your stock, your knowledge increasing with the numbers. There are three important factors associated with the increase in stock sidelines—breed, development of markets, and continuity of supply. There is a danger of over-production, which proves a greater difficulty than under supply, and compels the seller to produce the suitable trade type where otherwise the secondary types sell. This stresses the need for consideration of breed, as in the case of pigs. The State's production is equal to requirements, therefore overseas markets will have to be developed to gain access to the London market (which consumes an enormous tonnage of cured and uncured meats). It is essential to produce an article to compete against the world's best—produced, finished, and packed by specialist; therefore our one aim in pig raising must be to produce a type suitable



for export. Breed in dairying and poultry does not so directly influence the saleable product. We must deliver a clean, fresh article, the rest of the responsibility rests on the manufacturer and exporter. The lamb trade calls for extra care. Nothing but good breeding and feeding of a lamb produced from the popular Down breeds, maturing quickly, retaining its freshness, with fleshy, thick-set carcass, can regain the export lamb trade which we held and so foolishly gave up through our own neglect. This sideline, as with pigs, calls for specialising of breed and standardisation of type and weight. We must do our share of advertising overseas, but the quality of the article in show is the finest advertisement. The proof is in the eating, and a satisfied customer will always come back. My third factor—continuity of supply—is just as important as the production of quality. Australians in the past, when they had held a good, steady sale for an article afterwards dropped it for something a little more profitable, thereby letting another country cater for the market. This has been a hard lesson in many instances, and proves detrimental when we offer first quality goods in London. The buyers doubt our ability of continuity of supply. We have paid dearly for erratic production. Our position would not be as bad to-day had we worked and kept our sidelines through normal and boom times when wheat at 6s. lured us from the paltry sums which will take us two or three years to work up. Never lose sight of the fact, when we do gain our share of London's produce market and cereals rise in price, that consistency always wins the day. (Secretary, Mr. A. S. Dutschke, Maitland.)

#### PETERSVILLE.

April 28th.—Present: Seven members.

**ECONOMY.**—The following paper, "Economy on the Farm," was read:—"In the past many farmers have not given enough consideration to general economies. Farming machinery has been very expensive for quite a number of years. Machines that cost large sums of money should be worked by men that understand them. The farmer should give personal supervision at short intervals, and, above all, he should see that the machine is put under cover. Weather-beaten implements, especially the timber portions of them go out of shape. Every farmer should give serious thought before purchasing a new machine. One often notices much neglect of livestock. It pays to look after all animals really well. If horses are left to do all the work, 10 well cared for will take the place of 12 neglected ones. Cows are worthy of good feed and attention. Apart from the produce sold they keep the household in butter, cream, and milk. Some fowls should be kept, providing they are of good laying strain, otherwise they will eat more in grain than they produce. Every farmer should keep sheep, if for no other reason than to supply the house with meat. The tendency to-day is for the farmer to do without sufficient labor, consequently fences, outbuildings, &c., and in many cases cultivation of the soil is neglected, necessitating considerable expense in putting the improvements in repair again and probably a loss on the crop. If farmers try and become good buyers, average business men, thoughtful and careful managers, they will become economical farmers." Secretary, Mr. A. G. Dutschke, Ardrossan.

#### WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

March 31st.—Present: eight members.

**THE PIG-RAISING INDUSTRY.**—An article on this subject was read, and a good discussion followed.

Meeting held April 28th. Present: 10 members, five visitors. Mr. H. D. Adams (District Agricultural Instructor) delivered an address on "Pig and Fat Lamb Raising." He said the low prices of wheat and wool were causing farmers to go in more for sidelines. The sideline prospering most at present was dairying. Cows at present were very scarce and bringing high prices. He favored fat-lamb raising to pig-raising owing to the uncertainty of the local and overseas markets for pork and bacon. England consumed annually £50,000,000 of frozen meat, and of that South Australia exported only a few thousand pounds' worth. For fat lambs, the Merino and Southdown were the best suited, followed by the Merino and Dorset Horn. The ideal bacon pig was the Large White. The dairy cow favored was the Jersey. (Secretary, Mr. W. Cooper.)

GREEN PATCH (Average annual rainfall, 26.56in.).

March 26th.—Present: Seven members.

**THE GAWLER RANGES.**—Mr. L. Derrington read the following paper:—"The Gawler Range, starting from about 70 miles due west of Port Augusta and extending for some 140 miles in length and approximately 50 miles in width, comprises some of the best sheep farming country in South Australia. Enjoying a rainfall of about 9in. on the northern side and 13in. on the southern, the pastoralists have generally been able



to carry on fairly successfully when many other areas have been hit badly with periodical droughts. The Gawler Ranges do not conform to any regular lines of hills, but are broken up into separate hills, or clumps of hills, separated by flats and leads of varying widths. The hills consist of a species of red granite chiefly. The south and eastern sides generally (being away from the hot sun and rough weather) grow edible scrub and grasses, nearly to the top, while the north and western sides of these hills have little else but spinifex (porcupine) sparsely scattered round about the rough granite boulders, and large bare slippery faces of solid granite. In numerous instances, on close examination, these granite faces, apparently solid, show seams often in rectangular formation, and as the ages go by, the rock comes away in large cubic blocks, possibly a foot or more in size, disclosing underneath another apparently solid face. In other instances, these sections of granite stand out like fingers from the sides of the hills in five or six-sided blocks, varying in length from 15ft. to 20ft. long. Springs are not numerous in these regions, but rockholes of varying capacity prove very useful as a means of catching supplies of rainwater for the sheep man when out on his beat. Mount Yardea is the highest point of this range. Edible fodders are varied. They consist of saltbush and bluebush. These two main shrubs are in many instances getting eaten out, particularly round permanent or main waters. Geranium, barley grass, and spinach are generally plentiful after early autumn or winter rains, the two former herbage being very fattening. Geranium particularly is good right to the last when nearly black. Speargrass also makes a very fine show after August and September rains, and frequently the flats present miles of this waving grass. Speargrass is of far less nutritious value than most of the other grasses, except silvergrass, which is of little practical value. Speargrass also causes considerable eye trouble amongst lambs. Overhead fodders chiefly are the myall (which same is the best fencing material for durability), sandal wood, wild peach, bullocky-bush, and mulga. The droppings from all these trees are readily cleaned up by sheep. Mulga and bullocky-bush are particularly appreciated by cattle, and the seeds of the myall are splendid for fattening sheep. This tree, however, does not seed regularly. Spinifex or porcupine, which chiefly grows on the hills on the stony parts, is a very rough fodder, except when in seed about September or October. The seed of this is very fattening for all stock. Bindei is another weed which grows after a summer rain, and provides quite a good feed. *Water Conservation.*—The Gawler Range country provides many good catchments for conserving water in dams, and in most instances good holding ground is obtainable. In one or two instances the big dams are almost permanent. One in particular, a Government dam of big dimensions, has not been less than half-full for many years. Wells are, of course, the natural standby. There are numbers of these, generally of from 70ft. to 150ft. in depth, some deeper, giving respectively sufficient water for from 5,000 to 10,000 sheep. These waters vary in quality from almost fresh to 1½ozs. and 2ozs. of salt; 1½ozs. and 1½ozs. is very frequent, and stock do all right on that. A number of old wells scattered about show evidence of having done considerable duty in past years. These old wells are now too salt for use, and generally have big supplies. They have originally been fitted up with good steam engines, with the necessary sheds, double or triple pump of very solid construction, delivering a 3in. or 4in. flow of water, and stone tanks of circular design, varying in capacity from 20,000galls. to 50,000galls. These tanks, with long stone troughs connected, show evidence of splendid craftsmanship. They are built of granite and cement. Many of them date back to 1870 and 1880, and are in several instances still in good repair. It is stated that these tanks were built at the rate of ½d. per gallon, and later on 1d. The troughs, often about 100ft. long, have approaches all stone-paved. In regard to these wells, now in disuse, the question arises, that possibly when the stations were in running order in the early days, say about 1860 to 1870, the owners carried such big flocks, and sheep were very cheap, the losses sustained from salt water were not accounted heavy; but in these days similar losses would break the owner, so these old wells have had to be abandoned. The good wells are at the present time, on the better equipped stations, supplying large areas of country (comprising many paddocks) by long lines of piping and force pumps, thus reticulating the water, often to an elevated tank, and then by gravitation to storage tanks and troughs several miles away. This system benefits the stock, the wool, and the country. The sheep are saved a lot of travelling, which at the same time saves the country from being cut up or eaten out and prevents considerable dust, thus keeping the wool much cleaner. Also, reticulating water to the sheep where possible allows of more paddocks being supplied with permanent waters, and at lambing time permits of the ewes being worked in smaller mobs, thus preventing considerable mis-mothering and loss of lambs, which so often occurs in big mobs of lambing ewes coming considerable distances to water. On the more progressive stations all dams are netted in, and, either windmill or engine with pump, piping, and storage tank are supplied with troughing. This method has two main advantages:—first, by keeping the dam clean, and preventing loss of sheep by bogging when the water is low; also, considerable water is saved, as when woolly sheep enter the water considerable water is absorbed in the wool, and when the sheep goes out of the



dam a considerable amount runs out on the bank and is lost. In the early days paddocks on the big runs were frequently about 10 miles by 10 miles, cutting off 100 square miles in one block, and often only one water. One man had to ride the fences and oversee the stock. That idea is fast giving way to smaller paddocks, particularly where it is possible to make a dam or get a well. Smaller paddocks, and plenty of them, allow the owner to utilise all his country to the fullest advantage. The pure Merino is exclusively bred, and very fine types of sound, robust, and big-framed sheep are reared, growing big heavy fleeces of generally medium strength wool of clean, bright appearance. The average lambing percentage is generally about 75 per cent., and in better years up to 80 and even 90 per cent. Rams are generally allotted at the rate of four to the 100 ewes. The Ranges are generally far more profitable as a sheep-breeding and rearing proposition rather than fattening, chiefly on account of the distance from markets. However, in certain exceptional years large numbers of fine marketable wethers or lambs find their way to either the northern market or Adelaide. Lambing time is changing a good deal of late years. The general rule used to be to start lambing from April to May, but quite a number of owners now lamb in August, the reason being that they were more sure of green feed at that time than at the start of the winter. In good years some owners try a summer lambing about January, thus having some very fine lambs for the following shearing. Shearing time also is changing a good deal of late years. From late August till October generally saw most shearing-sheds in full swing. But now, since the blowfly has invaded the Ranges, many stations shear about February or March, thereby helping the ewes to fight against the sheep fly when lambing in August. About 17 years ago the sheep fly was not known in the Ranges, and lamb-tailing could be carried out without resort to any antiseptics or safeguards of any kind. But the fly is now as troublesome in those drier areas as down in the moister districts. As is well known, sheep farmers up there have their trouble with various pests—wild dogs, foxes, eagles, hawks, and rabbits. The dingo is not quite so troublesome now as formerly, chiefly on account of further outside country being netted in. But every now and again one dog or more manages to find its way through the netting, doing more or less damage. Foxes are very prevalent, especially at lambing time." (Secretary, Mr. C. Whillis, Port Lincoln.)

#### KOPPIO (Average annual rainfall, 22.40in.).

May 5th.—Present: Five members.

Correspondence was received from the Port Lincoln Produce Department regarding the development of the egg, butter, and bacon industries through the Port Lincoln Freezing Works, and invited the Branch to endeavor to supply information as to what quantities of same would be available for shipment through the above works. A good discussion on the subject followed. Members agreed that with profitable prices ruling for same the above lines would be speedily developed in the district, but it was not possible to accurately state any quantities available. Suggestions were made that if advertisements appeared in local papers farmers would realise that dairying and poultry-raising products were worthy of development. The Secretary read a paper, "The Wool Industry." (Secretary, Mr. M. Gardner.)

#### YADNARIE (Average annual rainfall, 14.09in.).

May 5th.—Present: Seven members.

**SIDELINES.**—Mr. C. Sylvertsen read the following paper:—"With wheat at such a low price it is necessary for farmers to exploit other avenues more fully to assist the revenue from the holding. There are three lines open to farmers in this locality—sheep, poultry, and cows; pigs, in the light of past experience, are not worth worrying about. Sheep are one of the most profitable sidelines. The Merino is the best for this type of country, but there is still room for improvement in building up the frame, also the weight and quality of wool per sheep. The opportunity may be availed of of disposing of a suitable number of lambs for freezing purposes by the use of a suitable ram. Dairying could be improved a great deal, the farmer giving greater attention to the quality and quantity of foodstuffs necessary to give maximum returns for the duration of the whole lactation period. In addition it is essential to give each cow in its food or otherwise 2ozs. of salt and super combined. I favor the Jersey breed. The cows are very productive and require a minimum of feed compared with the larger framed animals. In poultry I prefer the laying strain of Black Orpington or White Leghorn. The careless method of egg collection and the disposing of eggs at the store is a direct loss to the farmer of 3d. to 4d. per dozen. Eggs for market should be infertile, of a standard weight of 1½ozs. to 2ozs., collected once a day in winter and summer, and marketed through an infertile egg association." (Secretary, Mr. E. Spriggs, Cleve.)



## EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES.)

### KULKAWIRRA.

May 12th.—Present: 14 members.

Mr. R. L. Griffiths (District Agricultural Instructor) addressed the meeting on "The Farmer's Control over the Cost of Wheat Growing," and stressed the following points:—  
**Cultivation**—Early fallow to be kept clean either by cultivation or sheep. **Correct seed conditions**—A shallow mulch with firm compacted underlayers. **Varieties**—Free Gallipoli: A late wheat. In Victoria Federation has been the leading variety, but last year Federation was 17 per cent. and Free Gallipoli 35 per cent. of the total acreage sown. It suited almost all classes of land. **Mid season varieties**—Currawa, Caliph, and Felix. Joffre was fairly rust resistant. **Early varieties**—Gluyas for hard conditions; Sulton rather bad for rust; and Nabawa, a wheat of outstanding merit, 50 per cent. of the wheat area of Western Australia being sown with it this year. **Questions** were asked about the use of sulphate of ammonia. **Time of sowing**—Mixed with other super and sown with the seed. **Results** are not pronounced on fallow, but on stubble last year at Mr. Sanders, of Yurgo, super gave a hay cut of 2 tons per acre and super and sulphate of ammonia gave 3½ tons, an increase of 30cwt. per acre. (Secretary, Mr. H. Elliot, Karoonda.)

### MILLENDILLA (Average annual rainfall, 13in.).

April 9th.—Present: Seven members.

Mr. R. Hill (Agricultural Instructor) addressed the meeting on "Mixed Farming." The main points stressed were dairying and sheep, the latter being a necessity on every farm. He advocated the use of a Southdown ram mated with a Comeback or a Merino ewe, which would result in a lamb suitable for export. For the local market the Dorset Horn ram with the above-mentioned ewes would be quite suitable. The Corriedale ewe was not deemed suitable for this district, as it was a breed for the wetter districts, to which it was admirably adapted. For dairying, he advocated the making of stack ensilage, for which either oats, barley, or wheat should be sown if natural grasses were not sufficient, which was the case in this district. The cereals combined would make even better ensilage. Only as much as could be carted in the stack every day should be cut the same day. The stack should be 18ft. high at the least when finished. The outside of the stack should be left high and well trampled to prevent air getting in. The inside should be low, just the opposite to a hay stack. A layer of straw should be put over the top of the stack when finished and weighted down with not less than 500lbs. pressure to the square yard. Stones were preferable for this, placed on a layer of red gum slabs or anything else to give a level surface, thereby giving an even pressure all over the top of the stack. Next he stressed the importance of drinking water and shade during the summer months for cattle. The cows should be kept near this and not turned out in a 200 acre stubble paddock to be able to try and fill themselves before night with fodder which contained very little nutriment, let alone produce milk. The cows should be kept near the home and be hand fed whenever necessary. Oats, oatmeal, linseed meal, bran, or chaff were good fodders for dairy cows, and should supplement the natural pasture in the right proportion. Lucerne sown on stubble land at the rate of 3lbs. or 4lbs. to the acre provided excellent greenfeed, or even a small patch of lucerne near the house was just what the cows needed sometimes if it could not be grown on a more extensive scale. He also stressed the necessity for keeping better cows, cows that were worth milking and the trouble of feeding. A good cow would cost no more to feed than a poor producer. Oats sown on stubble land also provided early greenfeed for both cows and sheep, and Mr. Hill thought Lachlan would be the most suitable for this district." (Secretary, Mr. V. Wegener.)

### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

May 16th.—Present: 24 members.

**CARE OF THE FARM TEAM.**—Mr. C. Paech, who read a paper on this subject, said:—  
"When the team is brought in to start work each horse should be given a good grooming, as this not only adds to their appearance but assists in keeping them in good health. If the hoofs are too long it is advisable to cut them down. This will save considerable trouble, because if the hoof breaks off too deep there is a danger of it causing lameness. When starting the team to work at the beginning of the season take them steady for a few days. At this time the horses are likely to become overheated and develop scalded or sore shoulders. Watch the shoulders, and if one gets a sore shoulder see if there are any lumps in the collar, if so it can be smoothed out with a bottle, or the sore may be due to the draft being either too low or too high. If the shoulders are kept clean and the hair brushed straight and smooth it is not likely that there will be much trouble. **Feeding.**—Regular feeding is necessary to maintain good health, especially the midday feed. It is a mistake to give a long dinner hour and then a short one, 1½ hours to 1½ hours is enough for dinner if it is



regular. In the morning feed at 5 o'clock, and be back in the stable by 6 o'clock in the evening in winter time. Give enough feed, but not so much that they leave a lot in the manger. I prefer giving the team a drink before meals." During the discussion it was stated that it was a wrong practice to turn working horses out into green grass during week-ends; this caused the horses to scour and gripe. It was safe to turn them out every night after feeding when grass was plentiful; they would then be used to it. Horses should not be worked after sunset. It would be quite all right to start early in the morning to work a long day. (Secretary, Mr. C. Altmann.)

#### NETHERTON.

April 29th.—Present: 13 members.

**COWS ON THE FARM.**—Mr. F. Hogood read the following paper:—"If cows are kept for cream production the farmer should endeavor to obtain a good strain of animals, and if these are cared for, fed and looked after in the proper way, they will nearly always show a profit in bad seasons as well as in good seasons. I recommend the Shorthorn cow crossed with a Jersey bull. The Shorthorn is a very hardy breed and, as the Jersey is the best of all breeds for cream production, the cross recommended should produce the most profitable cows. The cows should be provided with plenty of shelter from severe cold winds and rain in winter, and, on this account, it is desirable to leave a few acres of scrub near the homestead. Make regular milking hours and see that each cow gets its fair share of feed. Before starting to milk see that the udder and hands of the milker are clean. Cows are of a nervous temperament and need very quiet handling to get the best results. In feeding for cream production, I prefer oats hay chaff or barley hay chaff cut on the green side. When feeding in the dry period of the year, best results are obtained from good chaff and bran mixed with molasses. Always give the cows a little salt and bonemeal occasionally, it assists in keeping them healthy. A paddock should be reserved near the homestead and sown with barley or rye to provide early greenfeed, and for summer, lucerne and maize should be grown. It does not pay to feed cows that do not show a profit, and do not always blame the cows before considering the feed and the treatment which they receive. Never kill any heifer calves from good cows. If you do not want them, sell or give them to a neighbor. If this is done there will always be good cows available, and the estate and district will benefit. If the management of cows is properly carried out, there is no reason for any farmer and his family to want so far as a living is concerned." (Secretary, Mr. C. Wilkin, Yumali.)

#### OVERLAND CORNER (Average annual rainfall, 10.50in.).

April 28th.—Present: 10 members and four visitors.

**FENCING.**—The following paper was read by Mr. J. Chesney:—"Usually the boundary of the property is marked by survey pegs, so that taking out a straight line is not difficult for the amateur. First put up enough pegs so that an alignment can be taken of them when putting in the posts. It is not advisable to sight the posts of line being put up; always sight them not less than three pegs ahead. *Six-wire Fence, 15ft. Apart.*—To keep stock on the property I advocate a fence of posts 5ft. 4in. long, 12in. circular at the small end, 20in. deep in the ground. Strainers 6ft. 2in. long, 18in. circular at the small end, 2ft. 6in. in the ground. This fence will take 352 posts to the mile. Strainer post should all be placed with bends (if any) towards sight pegs; strainers should be kept hard up against the back of hole. No strainer should have two bends, one forward and the other sideways; this will twist when straining the fence. *Measurements.*—In boring, all posts of six-wire fence should be 5in., 6in., 6in., 7in., 8in., and 10in. apart. Holes should be bored perfectly level. Up and down boring causes uneven spaces in the wiring and makes hard work pulling it in, and so a little care when on the brace will save much trouble. Running out the wire should be done the same way as the posts are put up, so that a leading wire can be strained. The middle one, or the one above should be used for this purpose. When running wire, make the wire fast on the strainer ahead to be strained back. This holds the strainer while the other five wires are being strained. The barb wire should be strained tight enough to just move the strainer on which you are working, the other is hard up against the back of the hole and will not shift. Always strain from the bottom of the post upwards. Should a post give a little it will tighten the top wire. A post would have to give a great deal to slacken the bottom wires. Properly strained wires are most important, if they are slack it encourages sheep to crawl. The length of the strains should not be over six chains, the wires will keep tighter; and should a wire break it does not make such a long gap. All new fences should be strained with a wire strainer or fork. When pinning, see that the back knock of the pin is towards the operator, so that it can easily be knocked out. Knock the wires well in when rounding posts. Keep the wire on the side of the hole when pinning, the wire will



hold better and no slack is lost. Always fasten the wires the opposite way around the post. Do not put all back wires on one side and head ones on the other, but arrange them alternately so that the strainer will not split with the severe strain. Wires should be strained tightly to pull the knots tight. They can be eased off a little, if necessary. This prevents snapping on cold nights, if figure 8 knots are used. Strainer posts at corners should be held in position by stays, which should be at least 10ft. to 12ft. long. They should be morticed in at not more than two-thirds of the height of the post, a little from the centre, to allow room for the wires. The other end should be about 1ft. in the ground with the butt against a solid block placed upright at ground level. Stays fastened over the top of the strainer are likely to lift the post. Where posts are scarce or expensive, fences are often built with the posts 20ft. to 30ft. apart. Light iron posts are sometimes used between the wooden ones, drilled to the correct gauge of the wires. In other cases droppers are useful. There are many kinds of droppers on the market, but the best is the wooden dropper, threaded on the wire and fastened by fine wire at top and bottom. These droppers should not touch the ground, because they are quickly affected by damp and white ants. In some districts fences with cement posts and iron droppers are becoming popular, and, although rather expensive, they make an everlasting job." (Secretary, Mr. J. Löffler.)

#### RAMCO.

March 10th.—Present: Seven members.

**THE BLOCKER'S HORSE.**—In the course of an address, "Care and Handling of Horses," Mr. R. Bell said a horse six or eight years old was best for the blocker. An aged horse was easy to handle, and in most cases could be driven by any driver. The main point in a horse was its feet; if these were defective the horse would never be a good worker. A horse that had been foundered was liable to have a recurrence of this trouble. Leading the animal on a hard road would soon show if it had been foundered. It would hold its head straight forward and carry the feet in a tender manner. Side bone was as serious a defect as founder. Side bone was a coral formation on top of the hoof, similar to a ring. White hoofs were soft and the horse would need frequent shoeing. A blocker required a horse somewhat on the quiet side, with good shoulders and sound feet. One should be careful in taking off the winkers, because if the horse was touchy it was liable to jump back. If it showed signs of this habit, a rope should be placed around its neck and the winkers taken off again quietly. A good fitting collar would do much towards saving trouble with sore shoulders. The collar should fit snugly at the neck, with just sufficient room to slip in the fingers. Plenty of good feed was necessary, but one should see that the horse cleaned up its feed after each meal. If the horse slobbered, it was usually a sign of teeth trouble. It was not advisable to only rug a horse in winter. The horse became accustomed to circumstances, and if it was stabled and then turned out in the cold, there would be trouble. Horses were liable to pick up sand in their district, especially when green feed came up. If sand developed, then a good drench, either of coffee or honey and milk, should be administered. A good discussion followed. Mr. J. Boehm thought it a good plan to get a young horse and train it. Mr. F. Lewis said often one could get a horse in the saleyards with feet not suitable for road, but would be quite suitable for the block, especially in this district. The main essential in a block horse was quietness, and if this was wanting the horse was a nuisance.

**HARVEST REPORTS.**—Meeting held April 10th. Present: Seven members. Mr. J. Boehm reported apricots 1 acre, pruned end of May and June. Ploughed and cross-cultivated in October, manured with two bags No. 1 bone manure at first irrigation and sulphate of ammonia one and a half bags. Fruit very good and fair crop; not so good as last year, but excellent grades; only one box of 1 crown in 1 ton. Crop received two irrigations. Nectarines—Crop light, but fruit of good quality. Picked and sulphured same day; not allowed to stand over night; results excellent. Mr. F. Lewis reported:—Apricots fair size. Manured with one dressing of sulphate of ammonia after fruit set—six weeks before picking. Mr. C. Boehm gave apricots 1ewt. per acre of sulphate of ammonia. Good quality fruit, but not a heavy crop. Vines—Mr. F. Lewis reported on two blocks, No. 15 and No. 23. No. 15 last year produced a light crop of Gordos and currants. Hot winds in December scorched a lot of grapes and reduced the yield. No. 23 yield was normal. This year results on the two blocks were reversed. No. 15 was 10 per cent. above normal in yield, whilst No. 23 (Gordos) were down 15 per cent., currants 10 per cent. to 12 per cent. down. No manure was used this year, but the plot had been well manured previously. General average of crop was given as currants slightly above normal, sultanas below, and Gordos slightly above. (Secretary, Mr. J. Odgers.)

May 4th.—Present: Seven members.

The meeting took the form of a Question Box evening. Mr. R. Bell asked what is the value of stable manure as a fertiliser for vines? Mr. E. Borrowes said stable manure was not to be excelled for this purpose. Mr. C. Boehm agreed, but said with











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